FOOD INDUSTRIES

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FIG. 1444
F. E. RISING STEM
GATE VALVE

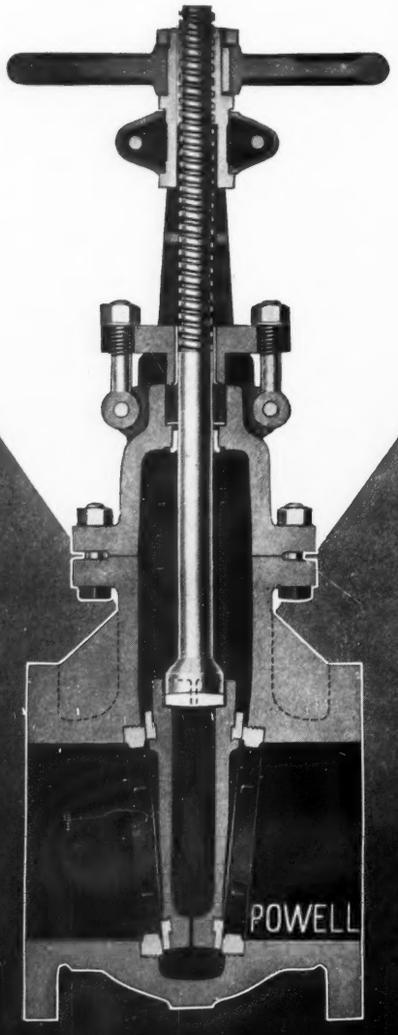

FIG. 1431
F. E. NON-RISING STEM
GATE VALVE

A COMPLETE LINE OF BRONZE, IRON AND STEEL VALVES ARE AVAILABLE FOR YOUR SERVICE.

FIG. 1444 SECTIONAL FLANGED END IRON BODY BRONZE MOUNTED RISING STEM GATE VALVE.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

This Month

ARTICLES ABOUT

Bakery Products
Page 169

Beverages
Pages 166, 176

Canned and Preserved Foods
Page 173

Dairy Products and Ice Cream
Pages 169, 181, 192

Fats and Oils
Pages 179, 183

Flour and Cereal Products
Pages 175, 176

Meat and Meat Products
Page 179

Other Food and Specialties
Pages 178, 183

Every Food
Pages 164, 166, 175, 183, 187, 190, 194

★

Accident Prevention
Page 175

Agitating
Page 179

Chilling
Page 179

Cooking
Pages 173, 179

Distribution
Pages 164, 169, 192, 194

Drying
Page 183

Filling
Page 179

Filtering
Page 179

Malting
Page 176

Management
Pages 164, 169

Materials Handling
Page 166

Packaging
Pages 181, 187, 190

Packing
Page 179

Packing, Vacuum
Page 178

Pressing
Page 179

Spoilage Prevention
Page 178

Sterilizing
Page 173

Trucking
Pages 192, 194

Vacuum Evaporating
Page 173

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Contents for April, 1936

Volume 8, Number 4

How Food Manufacturers Compensate Advertising Agencies *By T. G. MacGowan* 164

Low Cost Handling of Kegs and Barrels *By M. W. Potts* 166

Controlling Operations Through Cost Accounting *By L. H. Duckles* 169

Preserving Cherries by the Vacuum Method *By W. F. Robertson* 173

Explosibility of Dusts in Food Plants 175

Malting Is More Than Sprouting Barley—Part II *By Heinrich Lüers* 176

Coffee Staling Is Preventable *By P. W. Punnett* 178

Difficult Production Job Made Easy *By H. A. Merkel* 179

Simplified Containers for Dairy Products 181

Drying Foods With Non-Rotary Air Dryers *By Birney Miller* 183

New Carton Promises Savings *By Francis Chilson* 187

Food Packages and Products 190

Smaller Trucks to Cut Milk Route Costs 192

Problems in Truck Transportation Discussed 194

Departments

Talk of the Industry	159	**Business Trends**	202
Packaging Section	190	**Book Notes**	204
Automotive Section	192	**News**	205
The Plant Notebook	196	**Company Activities**	208
New Equipment	198	**Personals**	209
Catalogs	200	**Patents**	212

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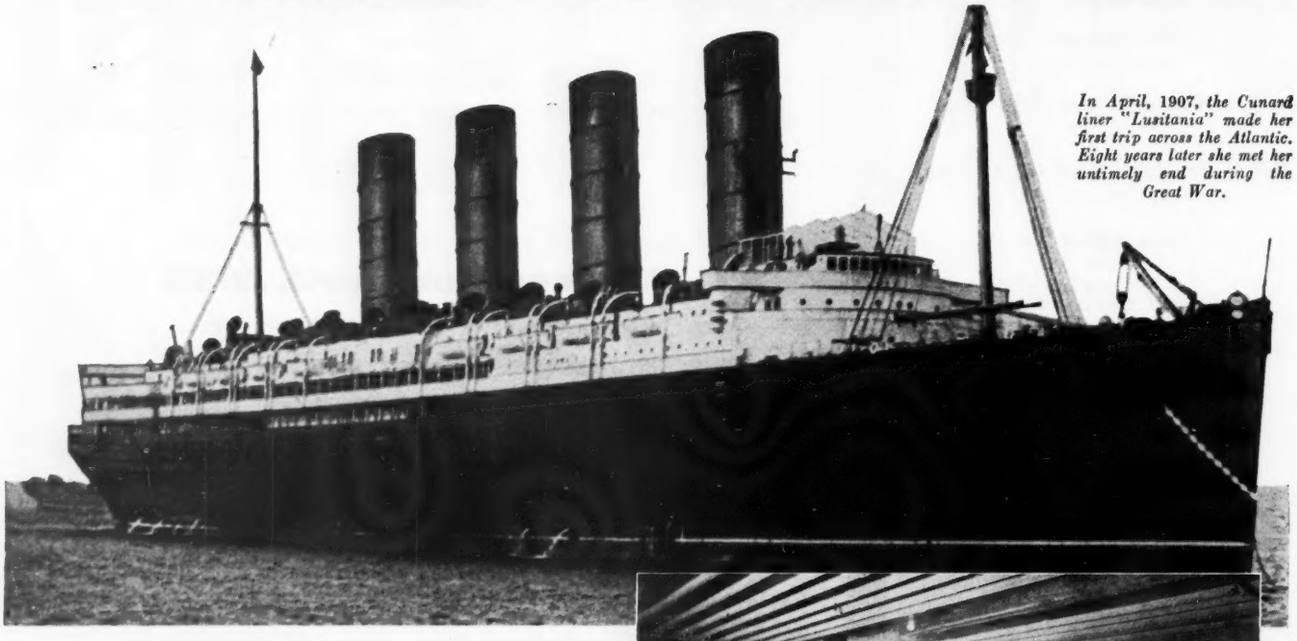
1907...THE LUSITANIA MADE HER MAIDEN TRANSATLANTIC VOYAGE



In April, 1907, the Cunard liner "Lusitania" made her first trip across the Atlantic. Eight years later she met her untimely end during the Great War.

1907 . . . ***Armstrong insulated this storage plant with Corkboard that was still serving faithfully twenty-eight years later . . .***

One of the freezing rooms, in the fish storage plant of Consolidated Weir Company, Provincetown, Massachusetts, insulated in 1907 with 6" Armstrong's Corkboard.

• • •

Exterior view of the Consolidated Weir Company plant. Twenty-eight years of service was given by the Armstrong's Corkboard installed in freezers, coolers, and anterooms in this structure.

WHETHER you're choosing insulation for a single low temperature room or for an entire warehouse, the experience of the Consolidated Weir Company, of Provincetown, Mass., is important to you! For, it is typical of the experience of users of Armstrong's Corkboard the country over.

Even before the ill-fated Lusitania had made her *first* crossing from Queenstown to New York, Armstrong's Corkboard was installed throughout the plant which this company built for the cold storage of fish. That was in 1907.

A few months ago, the treasurer of Consolidated Weir Company, Mr. I. M. Atwood, wrote as follows: "For twenty-eight years this insulation has stood and performed the functions for which it was designed which I think is a remarkable record." Recently some of this insulation was replaced and it was found that some areas were still well protected by the original material. Commenting on the job Mr. Atwood wrote, "We are more than satisfied with all of your work, both that done twenty-eight years ago and that done this year."

The reason for the *lasting efficiency* of Armstrong's Corkboard is the natural cell structure of the cork from which it is made. Thanks to it, corkboard resists the efficiency-destroying effects of moisture encountered in low temperature work . . . *continues* to give the same dependable, economical protection against the penetration of heat years and years after it has been installed!

For the whole story of Armstrong's Corkboard for cold rooms —and of Armstrong's Cork Covering for cold lines write Armstrong Cork Products Co., Building Materials Division, 948 Concord St., Lancaster, Pa.

Armstrong's CORKBOARD INSULATION

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Laurence V. Burton, Editor

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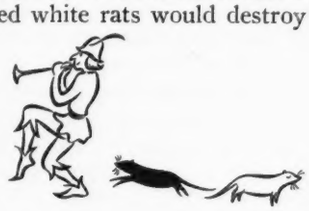
APRIL 1936

THE TALK OF THE INDUSTRY

THE latest lamentable exploit in wholesale experimentation, despite our repeated admonitions that all experiments should be performed on a small scale at the outset, has extended our knowledge of the gullibility of *Homo sapiens*.

A severe infestation of gray rats recently afflicted a certain food company. Conditions had become so bad that the management listened to an old-wives' tale to the effect that domesticated white rats would destroy gray



rats. Accordingly the purchasing department was instructed to buy 100 white rats and turn them loose in the plant. But, instead of destroying the gray rats, the white rats appeared to make friends with them quite easily and, as far as can be ascertained from official sources, there were very few, if any casualties.

No official census was taken of the rat population in the plant, but even to a careless observer, it became apparent that the time was fast approaching when the owners would have to abdicate. Then followed another council of war where it was decided to employ a professional rat exterminator. He was given the rather quaint instructions, however, to use only rat bait that could not harm white rats for these critters were domesticated and therefore a presumably benign affliction.

Unhappily for the white rats, at this time the Municipal Health Department became aware of the situation and most unfeelingly ordered the extinction of all rats irrespective of color, age or other pertinent antecedents. All of which goes to show that animal experiments in the field of racial antagonisms do not really need a three-story building for preliminary tryouts.

ACCORDING to the current Washington vaporings about revision of corporation taxes, this department ought to be much better off, financially speaking, when all corporate surpluses have been distributed to shareholders. Important, if true, Nevertheless we cannot forget that any of our investments made prior to 1929 would be liabilities today, had it not been for those much maligned surpluses.

Is it possible that the chap who invented the latest scheme is someone who never supported himself? Certainly it smacks of total unfamiliarity with reality or business and commercial troubles.

NO MORE gratifying news is available at this time than the knowledge that Columbia University has magnanimously, and with considerable self sacrifice, extended the leave of absence of Assistant Professor Rexford G. Tugwell for one more year. Let us all fervently hope that his administrative duties will permit him to take a large part in public discussions of the important issues of the day. His frank and honest revelations are needed today as never before.

LOCAL 20055, Technical, Editorial and Office Assistants Union has called off its strike against Consumers Research, Inc., a strike that had continued for four months. But the executive committee of Local 20055 announces that the fight will continue, that the 40-odd members will set up themselves as a rival organization, "The National Consumers Union," with Arthur Kallett and Dewey H. Palmer in charge. They will attempt to get the subscribers to Consumers Research, Inc., to cancel their subscription to that organization and join the new group.

In the meantime the C.R. row has been up before the Warren County (N. J.) Joint Council of Labor Unions, and the National Labor Relations Board, for investigation.

A large number of prominent people, including some well known professors of economics are sponsors for the new Union. The first headquarters of the organization will be at 26 East 17th Street, New York City.

WHO says that the food industries do not learn from each other? We have just received from Oklahoma a new plan to deliver hot oven-fresh bread in a tank to the consumer. The bread in this novel container is to be

subjected to vacuum "much after the manner in which Maxwell House Coffee is now protected by vacuum."

The idea is to have a truck or motor car equipped with a multiplicity of these vacuum containers, each 5 ft. long. The loaves of bread will be just long enough to fill the tanks, and, of course, just large enough to slip nicely

into them. Working directions are not quite clear to us but we believe the tanks are to receive the bread, hot from the oven. Next they are vacuumized and then they are delivered—still hot, with vitamin C still intact, the flavor, 'neverything to the retail store.

Here the problem is much simpler. All the grocer does is transfer the hot loaf to a portable vacuum tank having "capacities from 5 lb. up," pump out the air again and deliver it to the consumer. Of course, you understand, the loaf is still hot, still moist. No evaporation has occurred because the hot bread is in a closed container under high vacuum.

Don't ask silly questions. A vacuum pump pumps air, doesn't it? All right, how can water and flavor get out? The tank is hermetically sealed!

The best part of the plan is that these 5-lb. loaves shall retail at "a penny a pound." One thing really bothers us, however, what is one to do with a 5-lb. loaf 5-ft. long?

Taxes! Taxes!! Taxes!!!

PROBABLY 1936 will be a memorable year in ways that most citizens will not cherish. For those on relief it may not be outstanding. But for those who are carrying on the business of the nation, 1936 will go down as the beginning of high taxes.

The President once said over the radio, "We in this country don't know what high taxes are." However, by the middle of 1937 we will probably know the answer to that one, too.

All along it has been the Administration's policy to minimize the amount of taxes we pay in this country—to create the impression that in the United States we live in a taxpayer's paradise.

Contrast the official glossing over of our tax situation with the careful analysis of the facts by one of the Treasury's own tax experts. He has computed all the taxes paid for every purpose in the United States. Then he did the same thing for England. Next he computed the total of public expenditures for the two countries.

His resulting figures are huge, but when reduced to a per capita basis they reveal the true picture of the burden on each individual citizen. And it is alarming.

Total per Capita Taxation in 1935

United States	$81
England	$98

Total per Capita Expenditure in 1935

United States	$135
England	$117

Apparent per Capita Deficit in 1935

United States	$54
England	$19

Public expenditures in the United States on the per capita basis are the highest of any country in the world, said this same Treasury expert.

If these figures are startling, it is well to recall that in England the citizen is generally aware of it when he is paying his taxes. They are not concealed in rents, in commodity prices, in innumerable hidden places. In this country we are kidding ourselves. In contemplating this subject of taxation it is difficult to be calm and dispassionate and still more difficult to exclude the venom from one's judgments. But we submit that, in the foregoing figures which are available to Congress and to the Administration, lies the reason for the justifiable conclusion that 1936 is to be the beginning of really high taxation by state and federal governments.

The move to tax corporate surpluses as a source of revenue would pale into relative insignificance were it not for the fact that such a move is comparable to killing the goose that lays the golden egg—or, to use a more modern simile, selling the gas from the reserve tank in one's own car on the theory that it is never really needed in the car. Well, not exactly never, but only in an emergency.

If corporate savings become taxable because they are savings, then the next logical move will be to tax the individual's savings because they are not needed in daily living expenses. Before that time shall come let us hope that all promoters of spendthrift economy shall have received their great reward.

Berry's "Council" Reports

POSSIBLY you may have seen "by the papers" that Major Berry, Coordinator for Industrial Cooperation, has tried to sell the President

Hors d'Oeuvres

• Alcohol produced by dough fermentation and released in bake ovens is being recovered in Italy for military motor fuel. Part of the 1935 wine crop, too, is being distilled for the same purpose. In Napoleon's day soldiers marched on their stomachs. Now they ride on them.

• *We see where Nelson J. Dessert again has been chosen to head up the association of ice cream manufacturers in Michigan. Maybe there's something in a name after all.*

• Headline: "U. S. Buys Prunes for Relief." Well, they say they're effective.

The five Continental Can cuties who symbolized different periods and purposes of packaging at the Packaging Exposition drew quite a crowd. But something was wrong with the cast. The old fashioned girl stole the show and centered interest on the wrong packages.

• The government has had to resume the sale of potato-tax stamps to satisfy demands of philatelists. How about printing stamps for all commodities and forgetting about processing taxes?

• *Angostura-Wupperman Corporation has developed a process for flavoring sausage products with Angostura bitters. We suggest that "dogs" made with this seasoning be called Wupperman Weiners.*

• Baby lobsters are trained to dive at the Noank State Fish Hatchery in Connecticut. The idea is not to foster competition with the mermaids, but to make it easier for the crustaceans to escape being devoured by enemies when released to their natural environment.

• *The skinless frankfurter is perhaps the only product ever to be attractively packaged in transparent cellulose and then unwrapped before the consumer sees it.*

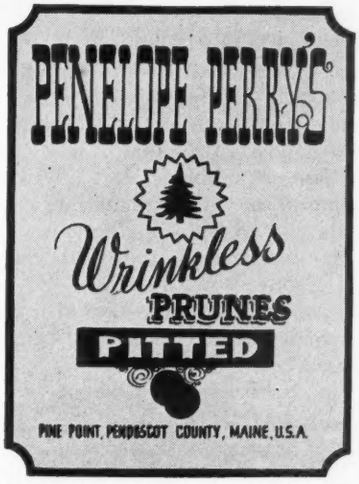
• We've seen so many new foods introduced that novel comestibles usually don't get us excited. But here's one that jarred us a bit—roast crow, served in Tulsa hotels. If we receive a case of canned buzzard in the next mail we won't be a bit surprised.

on the report of his Council for Industrial Progress.

Nothing that we have been able to learn has changed our prediction (Jan., 1936, F.I.) that it would be neither a council nor industrial, despite the presence of Messrs. D. G. Sherwin, S. F. Voorhees and Henry S. Dennison. Able industrialists though these men are, we do not consider that they can encompass the problems or experience of what is termed industry. One has no quarrel with them. There simply have not been enough men on the "Council" to be representative.

Moreover, industrialists have many vexatious problems of which labor relations are only a small fraction. To ask that three such men shall be the spokesmen for all industry when opposed to the views of three labor leaders like Sidney Hillman, Arthur Wharton and Frank Morrison, who have done little else all their lives than specialize on labor relations from the labor side—not from the payroll side—hardly seems to be the set-up that will arrive at conclusions of noteworthy value.

The principle result of the "Council's" report is that it recommends a permanent council. For what purpose? Are there not enough such research bodies already?



"ALMOST PERFECT PACKAGE"

A serious bunch, those who attended the Packaging Clinic at the Sixth Packaging Conference and Exposition, but some relief from solemnity was afforded by Hamilton Wood. He presented to the clinic a giant prune package, the label of which is above. Handbills distributed to the audience bore the legend: "Cash Prizes!! Finish this sentence with 20 words or less and win a new automobile. 'I eat pitted wrinkless prunes for breakfast because . . .'. (Or optional) Send to Penelope Perry three labels like the above from actual cans and she will mail you a deed to the canning factory and adjoining lot. Remember—one automobile to a customer—."

Unseen Factor in Prices

CONGRESS can hardly be expected to listen to the voice of reason when powerful political groups, like the farm bloc, are demanding cash relief. If the nation wants to donate from the public treasury there can be no effective protest. The majority rules.

Nevertheless, the food industries have a very sizeable stake in the method by which the funds for such appropriations are raised. If, as seems possible, there is to be another food processing tax, even though a temporary one, those processor groups which are compelled to act as tax collectors should make a very vigorous stand against the iniquities of the method.

The heads of what was formerly called the AAA have been reasoning from an entirely false premise on the effects of the processing tax. And, until they are convinced of their error, they will continue to bedevil the processors. To the AAA crowd there is no essential difference between doing business at one price level or another. They argue that if one million units can be sold at a low price, a similar number can be sold at a higher price, provided everybody moves his selling prices upward by the amount of the processing tax.

The error lies in the failure to realize that there is at least one unseen factor in any price relationship. That factor is the effective demand factor, and it is a notorious fact, well known to all business men in competitive fields, that effective demand can quickly evaporate when prices are too high.

Prices can be high only if the effective demand is there. And business, especially the food business, cannot arbitrarily jack up the prices and hold the market. On the other hand, if the effective demand is great enough the prices will reach the higher level quickly enough without any stimulus from Washington. Despite this elementary relationship of prices to demand, the AAA crowd sincerely believes that any branch in the food industry can arbitrarily impose higher prices. And they believe that the processors can get the higher prices if sufficient legal authority is granted to compel such action.

Many otherwise well-informed persons will regard this as a parallel to the age-old debate on whether the hen or the egg came first. But only those who are experienced in trading know the truth—that higher prices cannot prevail until people are able and *willing* to pay them.

The constructive view is to take taxation entirely away from the uncertainties of market prices. To be specific, a manufacturers sales tax is a far more workable method, though even this will have its economic as well as political faults.

Keep First Things First

REDESIGN of a line of packages has frequently been held to be the actual reason for increased sales of products in the new packages. Sometimes those who are more conservative in their utterances describe the redesigned package as the vitalizing force which has resulted in increased sales effort, and hence increased sales. Yet in either case the ultimate objective has been increased profits.

It is important to remember, however, that although either of the foregoing reasons may be true, it is also frequently possible to attain the profit objective by some other means. To our way of thinking, redesign of packages from the merchandising standpoint, as contrasted to the protective standpoint, should properly be subordinated to the whole merchandising program.

Conceivably, a company might spend money unwisely on one phase of merchandising that might be better invested on a more important matter, such as selective selling or controlled selling. By the latter term is meant choosing those customers and outlets that are the most profitable and concentrating on them. Wise management knows how easy it is to dissipate all the profits accruing from sales to profitable outlets by rendering too much service to the other group of customers whose orders are so small that they cost far more than they are worth.

Unfortunately for those who seek inspiration by the study of the doings of the more successful food companies, there is nothing of this character that can be learned by looking at a new package or examining the product. Selective selling is probably the most difficult to detect of all moves for it is carefully concealed at all times. No manufacturer cares to let any of his customers, big or little, realize that he regards any of them as pretty poor business prospects.

Hence it is easy for an onlooker to fall into the error of ascribing to the visible moves—the new package—the basis of success; whereas, it is often more likely that the intangible unseen policy of a better merchandising plan that may be the real creator of profits. It is advisable to keep first things first and seek for the possible hidden intangible forces before arriving at conclusions.

Successful Packaging Conference

THANKS to the earnest work and planning of the American Management Association, the 1936 Packaging Conference and Exposition held in March was the best and most helpful of the six annual meetings held thus far. A significant feature of the conference was the great interest in production equipment, protective packaging and shipping containers.

The final session devoted to shipping containers was a decided innovation and brought out a crowd sufficient to pack the ballroom at the Hotel Pennsylvania.

Another innovation was the round table conference on "Standards For Protective Materials" attended by nearly 100 persons. It proved to be equally successful, and aroused animated discussion on many phases of packaging. To C. A. Southwick of General Foods, in particular, goes the credit for presenting an exceptionally able paper on the place of the packaging and development laboratory and for answering a barrage of questions from the audience. Discussions arising from the floor covered principally: how to obtain odorless inks, how to deodorize labels, how to protect products from rancidity by various colors, and why it is necessary to have "ventilated" packages for some foods.

Food Explosions

EVERY individual foodstuff that is handled in dry form can constitute an explosion hazard if the food is finely pulverized and suspended in air. Now that we understand more about the nature of foodstuffs explosions, the more we are led to speculate on why more such explosions have not occurred in the past.

Among those who have specialized in the study of this hazard it has long been recognized that some foodstuffs possess a higher explodability than others. Until recently there has been no way of determining exactly how great this difference might be. But thanks to the researches of the Bureau of Chemistry and Soils of the U. S. Department of Agriculture these facts are now known.

The comparative explodability of most foods is presented elsewhere in this issue in tabulated form. Anyone having to do with the handling of dry foods can easily see where his particular commodity rates with respect to the others. And this table constitutes one of the most valid reasons of which we have knowledge for good housekeeping in food plants.

Penalty of High Costs

THE final chapter of the story of a once great plant is being written in a liquidation sale now going on. Those who are intimate with the affairs of the old concern hold the opinion that failure to provide this plant with low-cost facilities when profits were available caused its ultimate shut-down and liquidation.

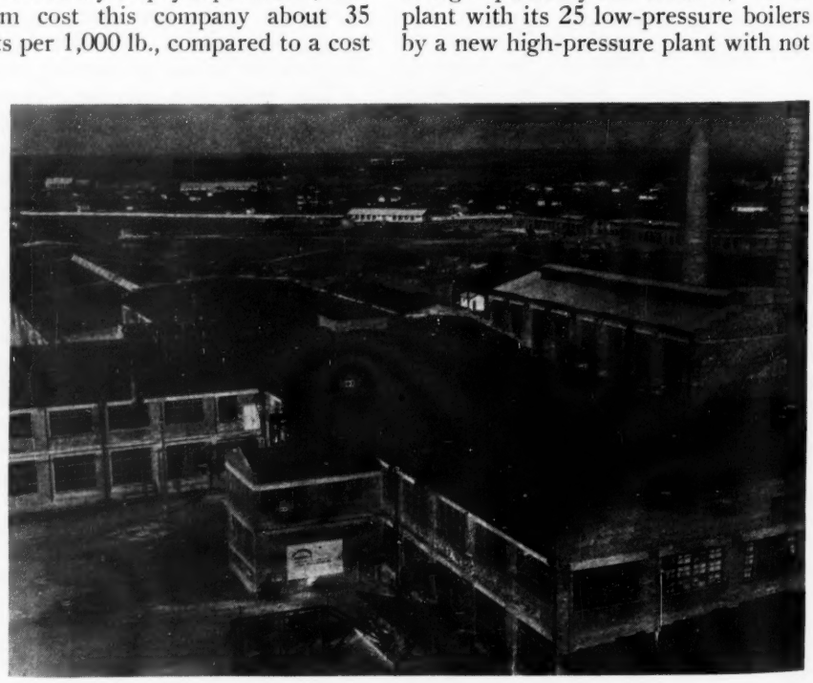
Its products were well made. They sold well. But its manufacturing costs were higher than its competitors; and high costs will lick any concern.

A study of its 25 boilers is very informing. They are of five different sizes rated at four different pressures. From private sources it has been learned that these boilers had settings that required special coal on which it was necessary to pay a premium; that steam cost this company about 35 cents per 1,000 lb., compared to a cost figure under 20 cents per 1,000 lb. for its competitors. A study of the rest of the power equipment also is informing: five simple non-condensing, engine-driven generator sets totaling 500 kw.; seventeen simple non-condensing steam engines totaling 1,895 hp. All were supplied with steam from the boiler plant of 9,608 boiler hp., which also had to generate all the process steam.

There is a huge number of electric motors totaling 1,896 hp., and it is evident that the 500 kw. of the generator sets could not drive all those motors. So the former company bought outside power. It had to use at least twenty transformers with a total capacity of 4,075 kva. In the old days the monthly electric power bill was reported to have run into five figures, sometimes as high as $25,000.

Here was a splendid opportunity to generate byproduct steam with all its resultant economies, but, though the operating force had urged that a low-cost power plant be installed, it is said that the recommendation was refused on the ground that the old boilers were still good. So they were, and they still are! But, to compete with other concerns in the same line, the boilers should have been larger and fewer in number.

In order to compete today it would be necessary to replace the old, though perfectly serviceable, boiler plant with its 25 low-pressure boilers by a new high-pressure plant with not



Sovfoto

SOVIET CANNERY STILL SHORT OF GOAL

Get out your back copies of FOOD INDUSTRIES and look at "Russia Enters The Canning Business," page 202, June, 1932. Here is the same Krimskaya plant, now known as the Mikoyan canning plant, which in 1931 had a capacity of 60,000,000 cans of vegetables, to be quickly increased to 100,000,000 cans. After four years of effort, the plant was able to produce 46,000,000 cans last year.

more than four steam generators of about 3,000 hp. each, producing steam at 650 to 900 lb. pressure. Those seventeen steam engines and five dinky generator sets would need to be replaced by two or three bleeder turbine-generators. These would furnish all the electric power needed at practically no cost for fuel, for it should never be forgotten that only about 25 per cent of the B.t.u. in steam is ever converted into mechanical power even under the best of conditions. The rest of the B.t.u. are available for process steam, of which a plant of this character uses enormous amounts.

It is known that the former company had purchased electric power in huge amounts in the past. From all that we can learn from former employees the cost of the electric power and process steam spelled the difference between profit and loss.

How much the net saving might have been, had this company modernized its plant in accordance with good business principles, we are not sufficiently interested to calculate. But we do know that wise reinvestment of the profits when they were available would have permitted the business to remain on a competitive basis.

To repeat our old saying, one modernizes to get low costs in order to make profits—not to be a good fellow. The motive is selfish, one of self-preservation. In this monumental failure to modernize with the times is an object lesson for every branch of the food industries.

Beat 54 Per Cent—If You Can

AGGRESSIVE management is examining every possible way to reduce costs or to increase profit margins. At the present time cost reductions appear to be the more likely of realization than increased prices.

To reduce costs, however, may require some really constructive thinking and an entirely new perspective. No one department of a business has a mortgage on brains. Nevertheless one would expect the operating department to be most alert to possible savings because of their greater familiarity. On the other hand the engineering department or laboratory may have the better perspective.

And one of the best pieces of cost reduction that has occurred this winter has come from an engineering department. A reduction in cost of processing amounting to 54 per cent has been achieved in one plant. And it has been accomplished in spite of the fact that the operating department regarded itself as highly efficient!

PICKING THE WINNER
Irwin D. Wolf (right), donor of the Irwin D. Wolf Trophy for the outstanding package among the twenty winners of the Awards for Distinctive Merit looks in on the award jury at work. Deciding the winner seems to be an ordeal.

Opportunity to Save

FOR many supplies, individual firms have their own specifications such as: salt (NaCl) that is so free from calcium salts that no precipitate will form when ammonium oxalate is added to a solution of the tendered substance; or vinegar that is absolutely free from copper; or a particularly low moisture content in dried skim milk; or extra heavy packaging materials, and the like.

All such exacting specifications cost money to both buyer and seller if business is to be done; and they usually lead to a shrinkage in the number of available sources of supply. Intelligent food engineers do not impose such narrow limitations unless there is a real need for them, one that is commensurate with the added expense.

A very fruitful field of research lies in study of all specifications for supplies with the idea in mind of trying to discover ways to utilize less expensive materials. Sometimes the incentive for such investigations comes from alert purchasing departments which have been known to drive a plant superintendent into a defensive position on his supply specifications. Puchasing department activities of this kind seem to be greatest when the department is under the sole jurisdiction of the president or vice-president of the company, and are sometimes noticeably less aggressive when the purchasing department is under the supervision of the production department. But conscientious production men do not need to wait until someone else goads them into performing such studies that may lead to substantial cost saving.

For a Separate Food Law

ISN'T it about time for the food industry to demand that the federal law regulating the industry shall be a Food Law—not a Food, Drug and Cosmetics Law?

In only two very unimportant aspects is there any parallel between foods and drugs and cosmetics. 1. Foods are always taken internally; drugs are taken internally sometimes; cosmetics never. 2. Under the present federal regulatory set-up both foods and drugs are supervised by the same bureau, the Food and Drug Administration. But, inside the bureau, except for internal administrative purposes, the food industries and drug industries are generally handled separately.

Aside from any possible slight reorganization inconvenience to the Food and Drug Administration there is no logical reason for including food regulations in the same law that regulates two other wholly unrelated industries whose problems are quite apart from those of the food industry.

How Food Manufacturers Compensate Advertising Agencies

By THOMAS G. MacGOWAN
President, Facts, Inc.,
New York, N. Y.

FOOD advertisers of all sizes are overwhelmingly in favor of the 15 per cent advertising agency commission system—considerably more in favor of it, in fact, than are American advertisers as a whole.

In the agency section of our comprehensive national survey upon advertisers' attitudes and practices, we found that the traditional commission plan for compensating agencies receives the approval of 86.4 per cent of the 44 food advertisers personally interviewed. This stands in striking contrast to a 76.4 per cent vote of approval accorded the plan among the entire group of 225 advertisers visited in the survey.

Food advertisers were found more favorable to a sliding scale of agency commissions than were advertisers as a whole, but less receptive to the idea of agencies' rebating commissions to advertisers and to the fee basis of agency compensation.

Of the food advertisers interviewed fourteen were large (spending more than $500,000 annually in advertising); fifteen were medium-sized (spending $100,000 to $500,000); and fifteen were small (spending less than $100,000).

The first question was:

"Do you in general approve of the 15 per cent commission system for compensating advertising agencies?"

THE largest food advertisers reported the smallest percentage in favor of the 15 per cent system:

Large food advertisers	85.7
Medium-sized food advertisers	86.7
Small food advertisers	86.7
All food advertisers	86.4

The affirmative responses to this question for the survey as a whole follow: large advertisers, 71.4 per cent; medium-sized advertisers, 74.7 per cent; and small advertisers, 82.7 per cent. Thus, it appears that among advertisers generally, as well as in the food group, the smaller advertisers tend to be the best satisfied with the *status quo*.

Advertisers were next asked similarly phrased questions to find out their attitudes on the sliding commission scale idea, rebating and flat fees. This questioning, intended to develop their ideas more in detail, did not require them to "vote" for one of the various methods against the other, but rather to give their opinions of each, irrespective of their ideas on the others.

The findings upon all these questions, and upon a final question, designed further to clarify the advertisers' attitudes on the 15 per cent system, appear in the table headed: "Summary of Advertisers' Attitudes on Agency Compensation."

In studying reactions to the 15 per cent system it is interesting to note the reasons given for approving or disapproving it. Food advertisers who approved the system gave reasons which may be divided as follows:

It is fair and equitable	25.0%
Agency earns it	25.0%
Nothing wrong with it	7.1%
As good as any other system	7.1%
Impractical to change so general a custom	3.6%
Any other plan would lead to chiseling	3.6%
Results in high quality work	3.6%
Other reasons	25.0%
	100.0%

These reasons were virtually the same as those given by all advertisers, except that the latter mentioned "fair and equitable" in 31.9 per cent of the cases, and "agency earns it" in 20.2 per cent of them.

Of the negative reasons of the dissenters in the food classification 44.5 per cent were: "not fair—either underpays or overpays." The rest were scattering mentions of "pay for each phase of service should be on different basis" and "makes agency think in terms of increased appropriations." The reasons given by the entire body of advertisers who took a disapproving stand followed the same general line, but only 37.1 per cent of them were: "not fair—either underpays or overpays."

"Do you feel that a reducing scale of agency commissions should be applied on large appropriations?"

OF ALL the food advertisers answering this question 73.0 per cent favor the idea of a reducing scale of commissions, as compared with 60.3 per cent among all advertisers who do so. That the desirability of a reducing scale depends entirely upon the amount of work done on the account is the opinion of 2.7 per cent of food advertisers, and

Summary of Advertisers' Attitudes on Agency Compensation

	Generally Approve 15 Per Cent Commission System?		Approve Reducing Commission Scale on Large Appropriations?			Favor Commission Rebates in Some Cases?		Like Flat Fee Compensation Basis?		Consider Commission System Equivocal or Inconsistent?	
	Yes	No	Yes	No	Depends Wholly on Work Done	Yes	No	Yes	No	Yes	No
Food Advertisers											
Large	12	2	8	4	..	5	7	4	9	5	8
Medium	13	2	8	3	1	3	11	2	10	3	12
Small	13	2	11	2	..	5	9	6	8	5	9
Total Number	38	6	27	9	1	13	27	12	27	13	29
Total Per Cent	86.4	13.6	73.0	24.3	2.7	32.5	67.5	30.8	69.2	31.0	69.0
All Advertisers											
Total Number	168	52	117	67	10	75	124	100	100	82	132
Total Per Cent	76.4	23.6	60.3	34.5	5.2	37.7	62.3	50.0	50.0	38.3	61.7

of 5.2 per cent of all advertisers. Small food advertisers were most in favor of this plan, 84.6 per cent of them expressing approval of it. Among all advertisers the medium-sized group was the one favoring it most, with an affirmative response of 65.5 per cent.

Reasons why food advertisers do favor the reducing scale plan were: "Should pay for services received," 61.5 per cent; "wholesale purchaser entitled to reduced rate," 23.1 per cent; and other reasons, 15.4 per cent.

For all advertisers the percentages were, respectively: 50.8, 39.2 and 10.0.

Negative reasons in the food group were: "Straight commission fair to all," 60.0 per cent; "fair determination of scale impossible," 20 per cent; other reasons, 20 per cent. For all the advertisers the percentages were: 73.1, 9.9 and 17.1.

"Would you in some cases favor commission rebates to the advertiser by the agency?"

HERE the food advertisers demonstrated their greater-than-average loyalty to the commission system through a very small affirmative vote of 32.5 per cent for this practice. All advertisers in the entire survey gave rebating an affirmative response of 37.7 per cent.

In the food industry and the survey as a whole the large advertisers proved the most favorable to rebating and the medium-sized ones the least so.

Reasons advanced for food advertisers' affirmative stands centered in "this is one way of giving effect to the reducing scale principle," with a percentage of 55.6. Next came "as a means of adjusting pay to service rendered," with 33.3. Affirmative responders in the entire study gave these two reasons percentages of 16.7 and 40.0, respectively, and 31.7 per cent of them said: "for sake of flexibility and contingencies."

Negative responses, food advertisers, and others provided an interesting comparison. Of the former, 81.8 per cent were: "it is shady and unethical," but this reason had a percentage among the latter of only 67.7.

Advertisers' Attitudes on Features of Reducing Scale of Commissions

Smallest Appropriations on Which Advertisers Feel Reducing Scale Should Apply

	Food Advertisers		All Advertisers	
	Number	Per Cent	Number	Per Cent
Under $100,000	..	....	11	18.7
$100,000 to 250,000	6	35.6	17	27.3
250,000 to 500,000	1	5.9	8	12.9
500,000 to 750,000	5	29.4	11	17.8
750,000 to 1,000,000	..	....	2	3.2
1,000,000 and more	5	29.4	13	21.0
Total Responders	17	100.0	62	100.0
No Response	27	....	163	....
Total	44	....	225	....

Minimum Commission Which Advertisers Think Should Be Applied on Scale System

	Food Advertisers		All Advertisers	
	Number	Per Cent	Number	Per Cent
3 Per Cent	1	6.7	4	7.4
5 Per Cent	2	13.3	8	14.8
6 Per Cent	1	6.7	1	1.9
7 Per Cent	..	....	8	14.8
8 Per Cent	..	....	1	1.9
9 Per Cent	..	....	1	1.9
10 Per Cent	9	60.0	26	48.1
12 Per Cent	2	13.3	3	5.5
14 Per Cent	..	....	2	3.7
Total Responders	15	100.0	54	100.0
No Response	29	....	171	....
Total	44	....	225	....

Sizes of Appropriations on Which Advertisers Think Minimum Commissions Should Apply

	Food Advertisers		All Advertisers	
Appropriations	Number	Per Cent	Number	Per Cent
$100,000 to $500,000	4	33.3	15	31.2
500,000 to 750,000	1	8.3	9	18.7
750,000 to 1,000,000	..	....	0	0.0
1,000,000 to 2,000,000	5	41.7	12	25.0
2,000,000 to 3,000,000	..	....	5	10.4
3,000,000 to 5,000,000	..	....	2	4.2
5,000,000 to 7,000,000	1	8.3	1	2.1
7,000,000 to 10,000,000	..	....	1	2.1
10,000,000 and more	1	8.4	3	6.3
Total Responders	12	100.0	48	100.0
No Response	32	....	177	....
Total	44	....	225	....

"Do you like the flat fee basis of compensation?"

THE food advertisers here demonstrated their liking for the commission method of compensation by saying "yes" to this question in only 30.8 per cent of the cases. Advertisers in general divided exactly evenly on the question, thus placing the fee system in the position of a serious contender for their favor.

Surprisingly enough, the small food advertisers were the food group most favorable to the fee system, with medium-sized food companies least so. In the large survey the small advertisers, who of course would have to pay more money for advertising service under a fee plan, were the most strongly set against it.

Food advertisers gave scattering mentions to the following reasons underlying their affirmative responses: "more elastic—fairer" and "especially good for small accounts." These same reasons were given by the affirmative responders in the whole survey, with certain minor variations.

The chief reasons why food advertisers opposed the fee system were these: "too difficult to determine" (28.5 per cent), "not equitable" (14.3), "not fair to agency" (14.3) and "encourages agency to skimp on service" (7.2). These percentages very closely approximate those for the entire survey.

"Do you see anything equivocal or inconsistent in an agency's attempt to serve the advertiser with counsel while being paid by the advertising media it recommends?"

A SMALLER percentage of the food advertisers answered this question in the affirmative than was the case with all the advertisers. Only 31.0 per cent of the food companies saw the agency in an inconsistent position, while 38.2 per cent of all the advertisers felt the agency's position was unsound. In both the food classification and the entire survey the large advertisers gave the greatest number of "yes" responses, followed next in order by the medium-sized ones.

The leading "yes" reason in both cases was that "the system prejudices the agency's judgment on recommendations" (food, 66.8 per cent; all, 43.9). Next came "system gives agency a bonus for recommending costly media" (food, 16.6 per cent; all, 27.4). "Not as businesslike as direct payments for services" followed (food, 16.6 per cent; all, 6.0).

"How is your own agency compensated?"

THE responses here indicate that 90.5 per cent of the food advertisers pay their agencies on a straight 15 per cent commission basis, 7.1 per cent on a fee basis and 2.4 per cent on a combined commission and fee basis. The division among all advertisers was: straight 15 per cent, 88.1 per cent; fee, 6.4; combined commission and fee, 2.0; reducing scale, 1.5; and others methods, 2.0.

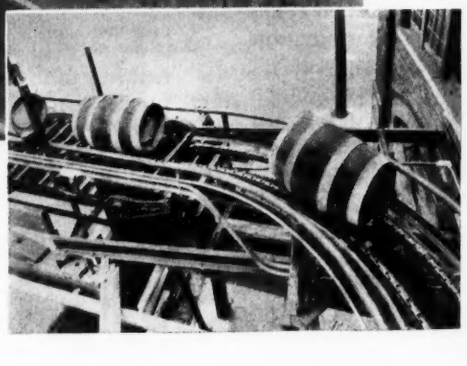


Fig. 1 (above): Kegs moving between pitch shed and washhouse on an elevated bridge over a city street, a reversible apron-type conveyor supplying two-way flow.

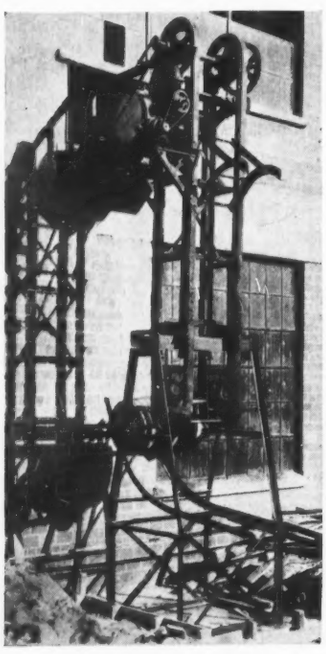
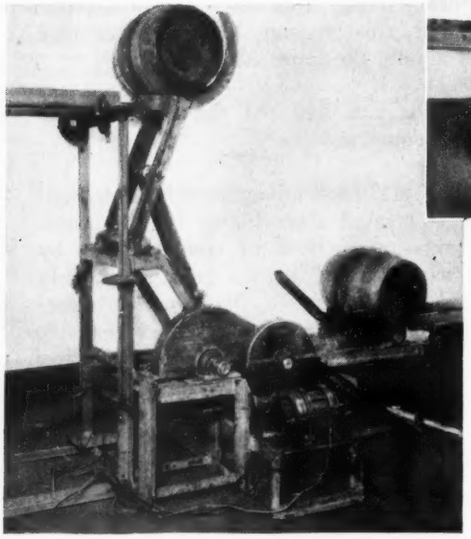


Fig. 3 (above): This barrel elevator can load or discharge on the same side, or can discharge at either side from the bottom.

Fig. 2 (above, right): Right angle change of direction is conveniently accomplished through the use of a two-strand, special-type chain conveyor.



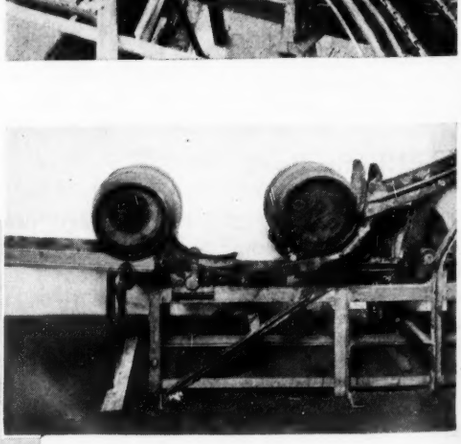


Fig. 4 (above): Automatic loader at entrance to keg lifting device.

Fig. 5 (left): A 5-ft. lift for barrels or kegs is accomplished with this device. By installing an automatic loader at the top, instead of the bottom of lift, the device can be used for lowering purposes.

Elimination of manual handling and increased speed of operations are advantages which have followed the installation of equipment developed to meet the modernization needs of the brewing industry.

Low-Cost Handling of Kegs and Barrels

By **MATTHEWS W. POTTS**
Materials Handling Engineer, New York, N. Y.

IT IS a mistake to believe that the best method of handling a keg or barrel is to roll it on the bilge. The method is true only for distances of a very few feet. When the distance is over 20 ft., and the service is anywise near to continuous, it is better to employ some form of conveyor.

When the brewing industry was revived after the repeal of the prohibition against the manufacture and sale of beer, it became necessary to re-equip many plants that had been standing idle for years. Plant managers then found that it was essential to eliminate manual labor wherever possible, in order to meet new costs and competition. They therefore decided, among other things, that, in spite of a natural adaptation to rolling by hand, even the kegs must be handled more economically and speedily.

Consequently, conveyor manufacturers were compelled to develop new designs of keg and barrel handling equipment, together with many new accessory devices. Since then, many successful installations have been made, both complete systems, and single units.

These conveyors and accessories can be applied for handling barrels, drums or similar containers in industries other than brewing. Diversity of container size does not interfere with operation and in breweries the new devices are handling quarters, halves and full-size kegs. It is apparent that other plants than breweries should investigate the application of these conveyors to their barrel and keg-handling problems.

The operation of these handling devices is most easily understood from a study of the photographs accompanying this article, which show some of the designs and illustrate, in general, how all of them work. Remember that, in every instance, automatic loading and unloading, and mechanical transfer from one conveyor to another, is required.

IN Fig. 1 and Fig. 2 are shown the type of conveyor that has been developed for handling kegs in straight horizontal and inclined runs. This particular installation required that the kegs be transported across a city street, up and down a 15 deg. incline alongside of a building and through a 90-deg. turn. It also involved the necessity of loading and elevating the kegs to an elevation of 22 ft. in the pitch shed.

In operation, the kegs are rolled out of the washroom on a skid, directly onto another conveyor similar to that shown crossing the street. This conveyor travels upon an incline alongside of the building and automatically transfers, at right angles, by means of a flexible chain conveyor (which originated in the dairy industry, for conveying cases around curves), as shown in Fig. 2, to the conveyor which crosses the street. The kegs then proceed across the street on the conveyor shown in Fig. 1, being discharged over its end, at an elevation of 22 ft., onto a 2½ turn pipe spiral which discharges them at floor level.

After the kegs have been pitched, coopered and conditioned they are held until wanted in the washhouse. The conveyor is then set in motion in the reverse direction. Kegs are loaded by hand onto a rigid-arm type barrel elevator, which discharges them back onto the elevated conveyor which crosses the street. They are then returned to the washhouse.

Fig. 1 is a photograph taken during construction of the new conveyor. It shows the old wooden bridge which formerly supported the keg skid run-

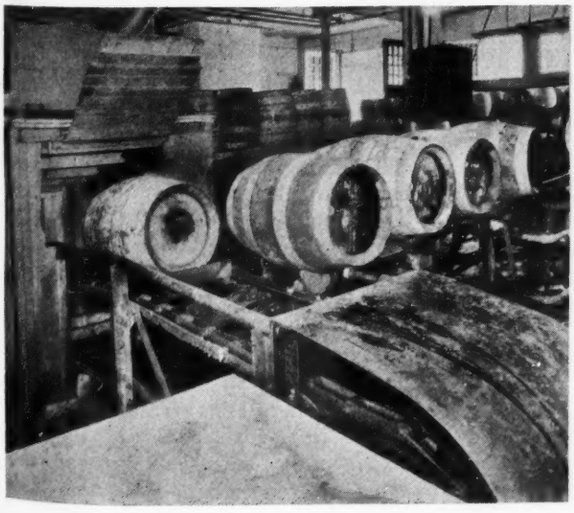


Fig. 6 (left): Change of direction through two right angle transfers is accomplished in this installation where the discharge of a keg washer feeds onto a conveyor through a skid runway and automatic loader set at right angles to the parallel center lines of the two machines.

ways. To get the kegs across the skid runways on that old bridge formerly required the labor of three men, while now it is done without any attendance whatever. It will be noted that the uprights for supporting the conveyor covering (not yet in place) are a part of the conveyor's steel bridge. After the conveyor was completed, the old wooden structure was removed.

The chain conveyor used for the right angle transfer shown in Fig. 2, can also be used for complete systems for handling kegs or barrels on the level. With this chain, it is possible to convey around corners at various angles. In several breweries, this type of conveyor is used for handling the filled kegs from the rackers onto the trucks. In one large installation where this type of conveyor is so used, the kegs are up-ended while the conveyor is in motion, and the labels and tax stamps applied while the kegs move. This design of conveyor can also be used for handling boxes and flat packages.

CONVEYORS for raising or lowering kegs and barrels, loading and discharging on the same side, with automatic kick-offs, are another of the new designs. Fig. 3 shows an elevator of this design, handling full-size barrels, which can discharge on either side at the bottom. This is known as a rigid type elevating conveyor and is equipped with an automatic feeder at the top and an automatic discharge to the skid runway at the bottom.

The accomplishment of short lifts for kegs and barrels is frequently difficult without resort to manual handling. New devices for accomplishing this are shown in Fig. 4 and Fig. 5. These are the so-called "kangaroo" or "grasshopper" conveyors. In operation, the motor of this device runs continuously in one direction, and the load-carrying arm is attached to a crankshaft which lifts and lowers it. An automatic loader is a necessary adjunct. This is shown in Fig. 4, and is operated by a lug on the carrying arm. The conveyor shown in these illustrations is for lifting kegs approximately 5 ft. The same type of conveyor is used for lowering, in which case the automatic loading device is located at the top end of the carrying arm device. The same general design can be adopted for handling any type of package.

Physical layout of the plant and the location of the handling operation have a direct bearing on the type of conveyor selected. It is frequently necessary for a conveyor to receive packages from another conveyor or unit of processing equipment, when obstructions intervene which cannot be removed, such as pipe lines, power cables, frames, and so on. It is then necessary to design a handling installation that will avoid these obstructions, even at considerably greater cost than would be involved if the obstructions could be removed.

Such a case is illustrated by Fig. 6. Here the keg washing machine location is shown at the right of the picture, while the rackers are located in the cellar below, in the same line across the building, but against the opposite wall. By using an apron conveyor running on a steep incline, it was possible to lower and transport the kegs from washer to racker with one conveyor and without the aid of transfers. An automatic feeder, operating at right angles between the washer discharge and the conveyor, made this possible.

IN most cases where the physical layout is unfavorable it is generally necessary, however, to use more than one conveyor. An example of this is shown in Fig. 7 and Fig. 8. Here the kegs are unloaded from cars on a trestle, about 20 ft. above floor level. They are unloaded onto a skid runway and rolled to the automatic loader which feeds an elevator used to lower the kegs. The top of this elevator is shown in Fig. 7, and its discharge in Fig. 8. On discharge these kegs transfer at right angles to a conveyor which transports them to the point of use.

In general, the installations shown in Figs. 1 to 8 have a capacity from six to eight kegs per minute, but can be speeded up to at least ten kegs per minute if desired. The devices discussed are only a few of the many barrel and keg-handling devices that have been developed, but are sufficiently characteristic to demonstrate the utility of recent designs. An incidental but important, byproduct of their use is the elimination of many accidents that would occur with manual handling, and the protection of the containers from damage.

The pictures accompanying this article were furnished through the courtesy of the Alvey-Ferguson Co.

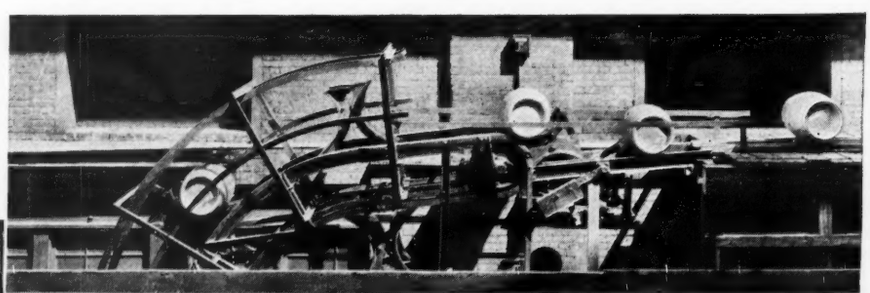


Fig. 7 (right): Kegs unloaded from freight cars on this trestle are regularly fed into the plant by means of this keg elevator and its accompanying automatic loader.

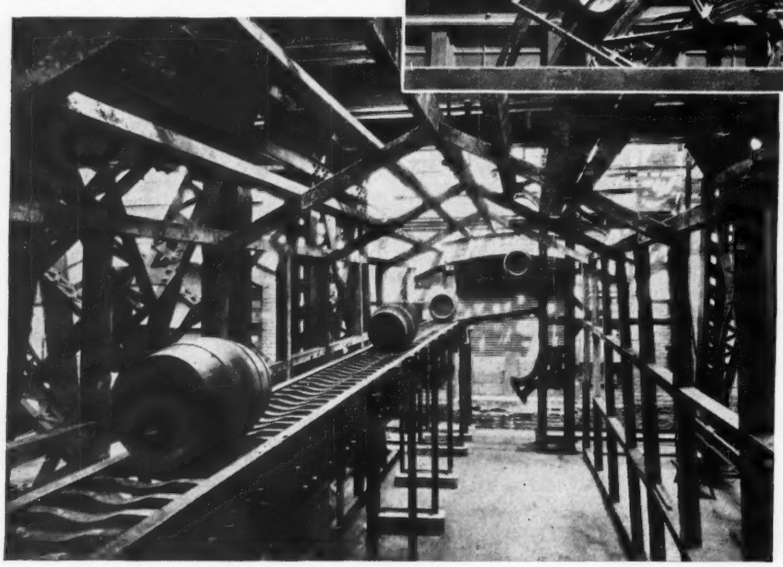


Fig. 8 (below): Keg elevator delivering kegs at regular intervals to conveyor which feeds washer.

Controlling Operations Through
Cost Accounting

Bread baking, although only one of many types of food manufacture, serves as an example of how factory operations can be translated into cost accounting control.

By L. H. DUCKLES
Quality Bakers of America, New York, N. Y.

THE baking industry, as well as the dairy industry, is singularly fortunate in possessing certain advantages that make the operation of a cost system relatively simple and at the same time permit management to exercise close control over operations.

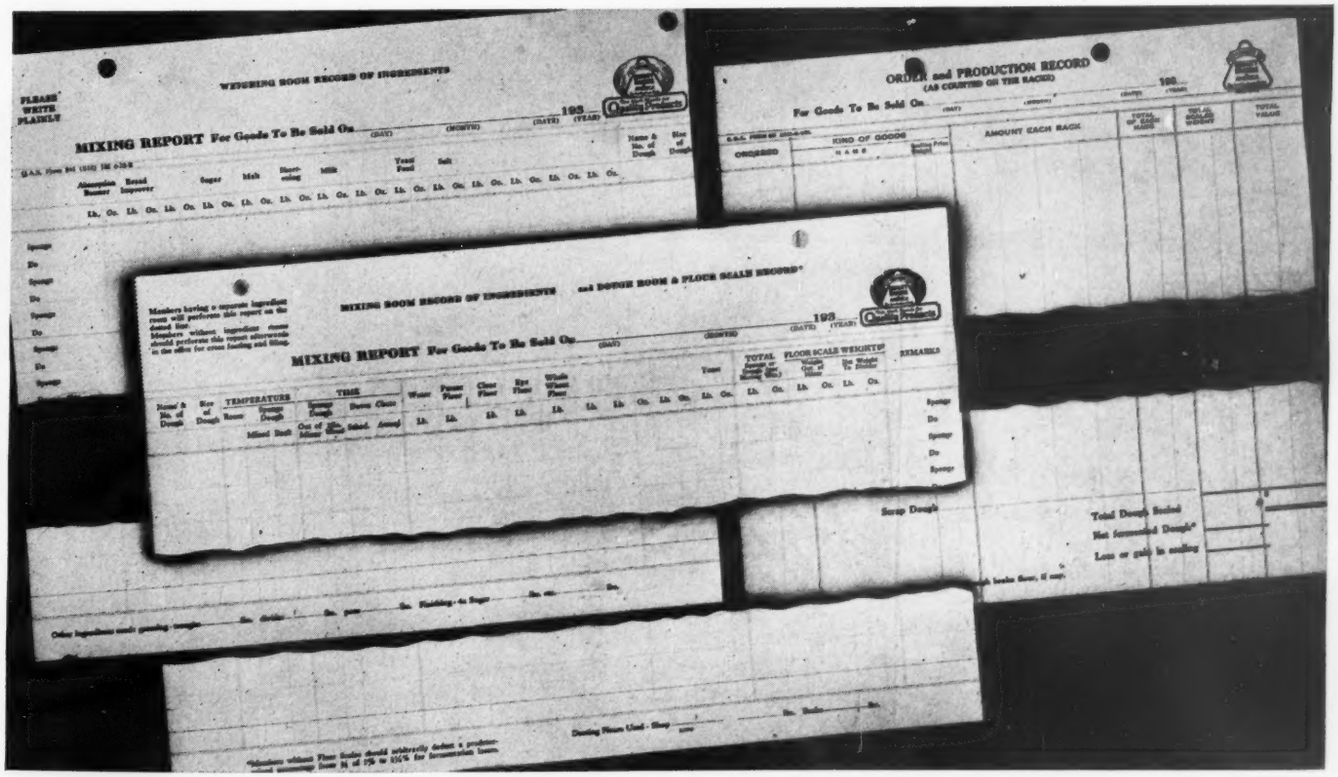
First, there is the 24-hour cycle of operations. Each business day, a complete cycle of production and distribution activities is begun and ended. The primary purpose of the cost accounting system is to record the facts, from both a cost and a statistical approach, of these daily activities.

Second, proper accounting records enable the executive to visualize the day's operations by noon of the next day, in such a manner that, were he to be physically isolated from the actual manufacturing operations, he could still maintain adequate control and properly direct the business.

Similarity of operations, in bread baking particularly, makes it possible for standardization of cost accounting systems, whereby interested executives of entirely independent companies may submit their cost figures to a central bureau for compilation and preparation of a comparative cost report. For instance, the ice cream manufacturers, through their national trade association, have the opportunity to submit, and in return receive, comparative cost figures on operations. It is unnecessary to dwell on the advantages which an executive can derive from the study and use of the operating histories of plants so similar in nature to his own.

A further advantage from an accounting standpoint is that there is no work in process to complicate the presentation of material, labor and overhead costs, while the item of finished goods inventory is negligible.

With this introduction as a background, a detailed description and explanation of the forms and their

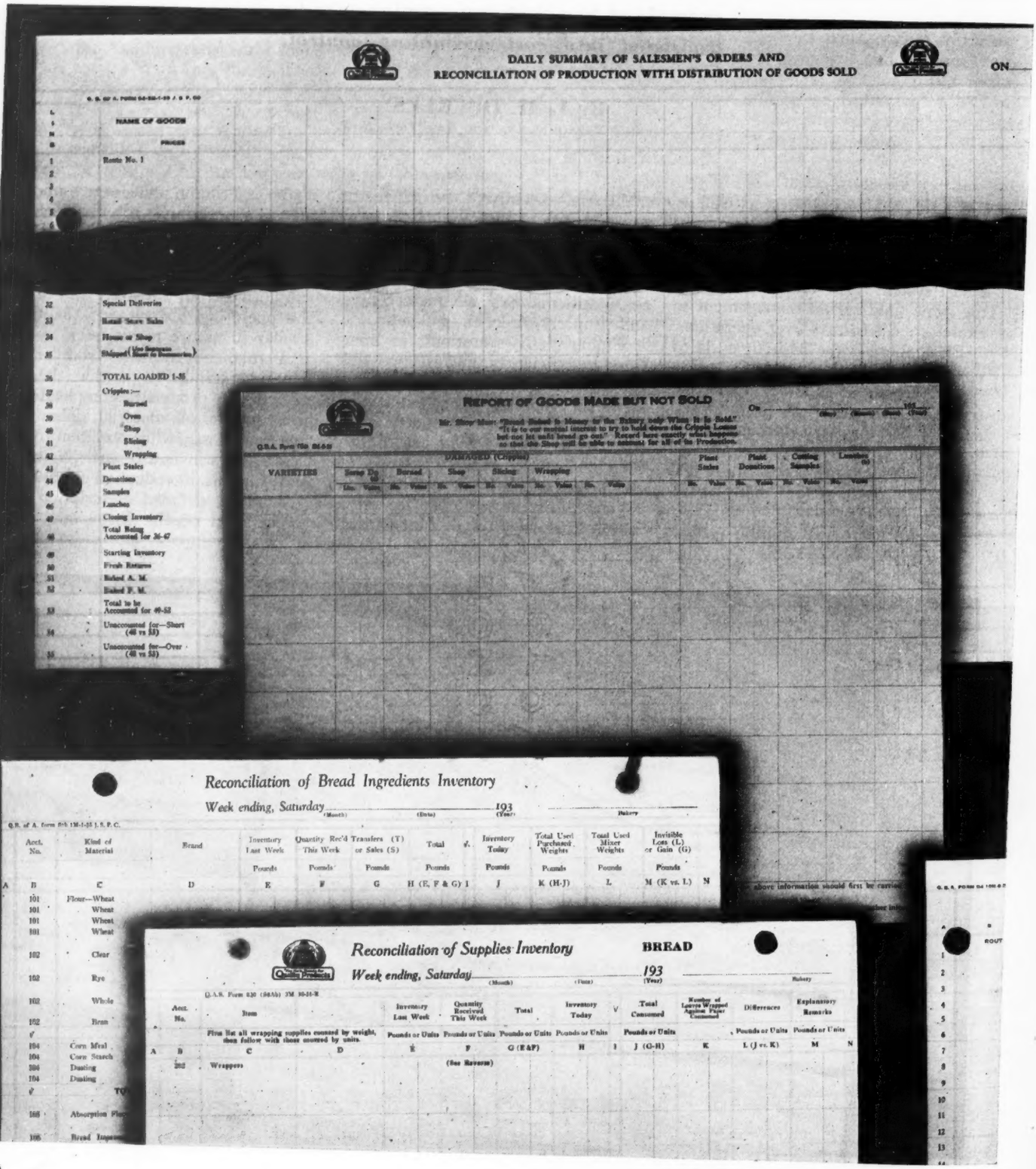

WEIGHING ROOM RECORD OF INGREDIENTS
MIXING REPORT For Goods To Be Sold On
ORDER and PRODUCTION RECORD
(AS COUNTED ON THE RACKS)
For Goods To Be Sold On
KIND OF GOODS
AMOUNT EACH RACK
MIXING ROOM RECORD OF INGREDIENTS and DOUGH ROOM & FLOUR SCALE RECORD*
MIXING REPORT For Goods To Be Sold On
TEMPERATURES
TIME
FLOUR SCALE WEIGHTS
REMARKS
Scrap Dough
Total Dough Scaled
Net fermented Dough*
Loss or gain in cooling

use in the operation of a cost system in a bakery follows.

Salesman's Order Sheet—This form is an estimate of the products which the salesman anticipates he will be able to sell. It is made up daily in duplicate by each salesman. A list of varieties required is shown vertically together with columns for quantity ordered, add or cut, issued, total issued and total value. At this time only the figures in the quantity column are used. The order sheets are totaled to arrive at a total order for each variety, which then becomes the basis for an order to the shop to bake the required items. The salesmen's orders, original and duplicate, are then sent to the shipping room to be used later in the distribution to each salesman of the items ordered.

Order and Production Record—This form originates in the office, being a summary of the individual salesmen's orders. It is then turned over to the shop superintendent, who is responsible for listing thereon the total production of each baked item. When the day's bake is completed, the form is returned to the office to be completed. This routine will be discussed later.

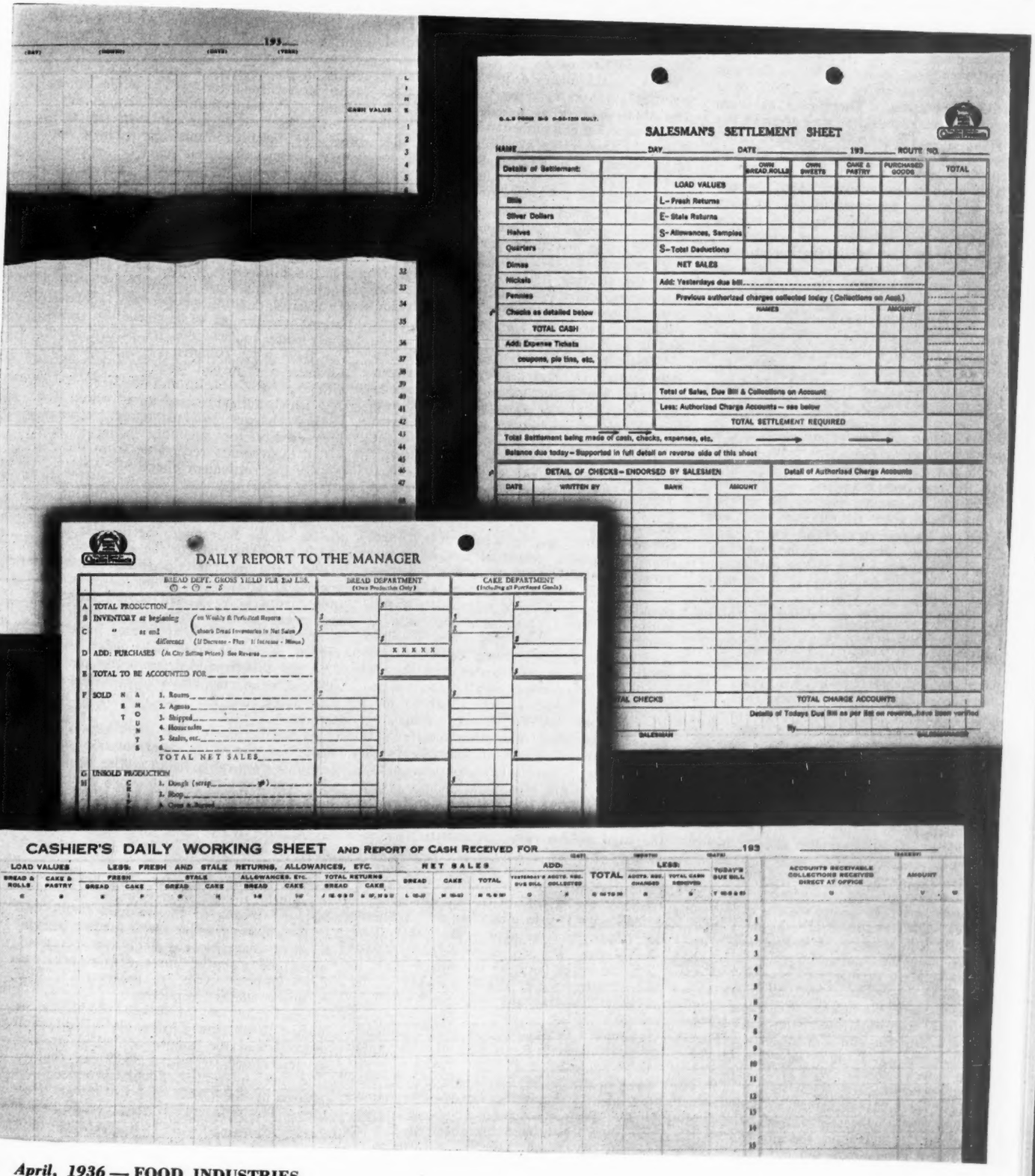
Mixing Report—The shop superintendent translates the day's order, as shown by the Order and Production Record, into doughs, which vary in weight with different bakeries, depending upon the size of the mix-



ing equipment available. Each day the shop superintendent prepares the Mixing Report, listing in the columns headed temperature and time, the temperature at which the sponges and doughs are to be mixed, and the time of mixing, and other technical production details. The form consists of two sections which are used separately, or as one form, depending upon the size of the bakery.

Ingredients are weighed out according to formula and recorded on the report under the proper column, as flour, water, yeast, sugar, and so on. This procedure is followed on each sponge and dough mixed. In the last two columns at the right of the form are entered the weights of the sponges and doughs out of the mixer and the weights of the doughs when ready to pass on to the next operation. The column headed total sponge or dough per mixer weight is used to record the cross-footing of the weights of the various ingredients. The total of this column compared with the cross-footing of the totals of the individual ingredient columns makes the form self-balancing, this work being completed in the office.

Rack Tags—The finished doughs pass from the dough room to the divider. The count of divider production is taken at the molder, when the pieces of dough are panned. This count is marked on the Order and Production Record in the column headed "amount each rack." The rack tag,



which shows the brand name of the variety and number of pieces on the rack, accompanies the rack through one more intermediate stage to the feed end of the oven, where the count is verified by the operator, and the tag detached and placed in a locked box. At the end of the day, this box is opened by an office employee and the tags taken to the office to be checked against the Order and Production Record in case any differences are discovered later.

Report of Goods Made But Not Sold—In bakery production, as in other food industries, there are spoiled and damaged goods which are not saleable. If no control is exercised over these production losses, they can mount to a large sum over a week's or a period's operation. Therefore the shop operatives are required to turn over to the shipping clerk all spoiled or damaged products, which he then lists on a suitable record.

This form is also used to record the sundry disposition made of fresh products through channels other than the regular distribution to salesmen or customers. Bread may be used for inspection samples, as samples to a visiting customer, for employees' lunches, or may through oversight go stale without having left the shipping floor. The information recorded on this form is used in reconciling the total quantity and value of production with distribution, as next described, and is also listed on a report known as Report to The Manager, to be described later.

Reconciliation of Production With Distribution of Goods Sold—This form serves a double purpose, first being used to recapitulate the salesmen's orders, as previously described. It is then sent to the shipping room, along with the Salesmen's Order Sheets, to be used in checking out goods to the salesmen. Because of the perishable nature of bakery goods, and of the 24-hour cycle of operations, there is no finished goods stockroom, as such.

Finished products are delivered to the shipping room from the wrapping room. There they are counted by the head shipping clerk according to varieties, and compared with the total ordered, as shown by the Reconciliation Sheet. Rack Tags as a general rule do not accompany the product from the discharge end of the oven. The molder count as verified at the oven, less any burned, shop or wrapping cripples, should agree with the quantity received by the shipping clerk.

It is impossible so to estimate the weight of dough as to allow for cripples and to provide exactly the number of all types of varieties ordered. The policy in some plants is always to overbake, distributing exact orders to the salesman and carrying the excess as stock for extra or special orders. This usually results in plant stales. Usually a few more or less units are received than the total order calls for. The shipping clerk is therefore required to cut or add to the orders of the individual salesmen, marking the necessary changes on the original and duplicate Salesmen's Order Sheets, and on the Reconciliation Sheet. If there are any large differences, the shipping clerk checks with the production superintendent.

The original salesmen's orders are turned over to the salesmen and the duplicates are returned to the office with the record of goods made but not sold, and the Reconciliation Sheet upon which the shipping clerk has entered the cripples, donations, samples, etc., and the closing inventory.

The reconciliation is now ready to be completed by the office. The first step is to foot the vertical varieties columns to obtain the total units distributed, these being entered on line 36. This total plus the cripples and other deductions plus closing inventory gives the total units being accounted for on line 48. The starting inventory, if any, plus the total baked, taken from the Order and Production Record, gives the total units (by varieties) to be accounted for. The difference is accounted for as short or over.

Next the salesmen's orders are extended, quantity times price, to get full sales value. The total load of each salesman is also computed on the Reconciliation Sheet and shown in cash value at the far right side of the sheet. The total of this column to line 36 should agree to the penny with the total of all the totals of the duplicate Salesmen's Order Sheets. The cripples, samples and other deductions and closing inventory are priced and extended at full sales price in the cash value column. Likewise the starting inventory cash value is determined and the full sales value of the order baked as shown by the total value column of the Order and Production Record is entered.

Thus all products are reconciled as to units and value. Any discrepancies between the total load value for each salesman as shown by his order sheet and that shown on the reconciliation sheet are traced down and corrected, as the duplicate order is the basis for the preparation of the salesman's settlement sheet which will be described later.

Recording and Control of Materials—The control of materials by means of a control storeroom and a perpetual inventory system is practiced by relatively few bakeries. The system generally in use is that of weekly reconciliations of ingredients mixed, with ingredients consumed, according to book or purchase weights. The standard cost system which is being described provides for weekly inventories and the recording of the receipts of all materials and supplies on receiving tickets, which must support each invoice before payment is made. The total quantities received are listed on the forms Bread Ingredients Inventory and Supplies Inventory in column F. This weight plus the previous inventory (column E) less any transfers (as to the cake or pie department) is extended to the total column H. Deduct today's inventory and the quantity used at purchase weights is obtained in column K. This is compared with the recapitulation for the week of the quantities of ingredients consumed according to mixer weights (column L) taken from the appropriate columns of the Mixing Report, previously described. The difference between the two weights is extended to column M and is known as the invisible loss or gain.

Salesman's Settlement Sheet—This form is prepared daily in the office. The load value of bread, cake and other products is entered in the columns provided and the total extended to the total column. The amount of the salesman's due bill or personal shortage is entered from the sheet of the day before. When the salesman returns to the bakery after completing his day's distribution he is ready to settle. He extends his own copy of the order sheet and his total must agree with the total load value as shown on the settlement sheet which is turned over to him by the cashier to complete. The total settlement required is arrived at as follows: Stale returns, allowances, etc., are deducted from total load value, giving net sales. To prevent possible misappropriation of cash through overstatement of stale returns, allowances, samples, etc., the salesman must present with his settlement sheet a detailed list of products returned as stale, which is made out, priced, and extended by a shipping room employee. Many bakeries place a limit on the quantity of stale goods which may be returned for credit, while others permit such returns only on certain days. Allowances such as discounts off full selling price, for bread stolen from truck, and other unusual situations must be approved by some person in authority such as the sales manager.

To the amount of net sales is added yesterday's shortage plus collections on account of authorized charge accounts. From this is deducted today's authorized charges and the difference is the total settlement required. This must be settled in cash and the today's due bill or personal shortage, both of which must be supported by appropriate detail as provided for on the form. The sheet when completed is signed by the salesman and turned back to the cashier with the cash, checks and duplicate sales slips which are later used as a medium for posting charges to customers' accounts. The credits for amounts collected are posted to accounts receivable from the detail on the settlement sheet.

Cashier's Daily Working Sheet—This form is used to recapitulate the information shown on the Salesman's Settlement Sheet and it takes the place of the salesbook, furnishing the information from which the periodical sales entry is made. The columns from C to T are posted from the settlement sheet as soon as the settlement is completed. When all routes have been settled, the total is brought down to line 27. To this is added house or platform sales, sales of cripples and stales, and shipping sales, and the total (line 31) is determined.

At the bottom of the sheet provision is made for the daily determination of the accounts receivable balance, the bank balance and the total cash receipts which are deposited daily in the bank. The daily totals from line 31 are posted to a recapitulation sheet of the same form to get weekly and periodical totals.

Report to the Manager—As pointed out previously, the daily recording of operating facts by means of the various forms described above enables the managing executive to exercise close control over operations when the essential facts of the previous day's 24-hour cycle are presented to him in one condensed report.

The value of the baked production is posted from the Order and Production Record and the weight of baked product is determined by taking 88.89 per cent of the net fermented dough produced, as shown by the Order and Production Record. The difference is the average loss in

(Turn to page 211)

Preserving Cherries *by the Vacuum Method*

By W. F. ROBERTSON
Medford Hillside, Mass.

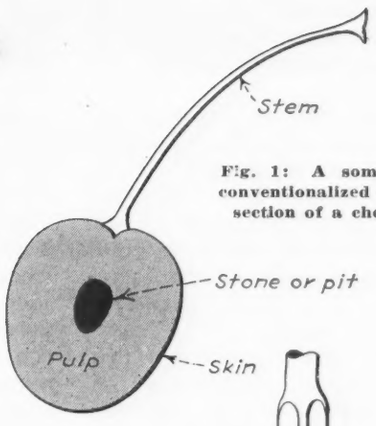


Fig. 1: A somewhat conventionalized cross-section of a cherry.

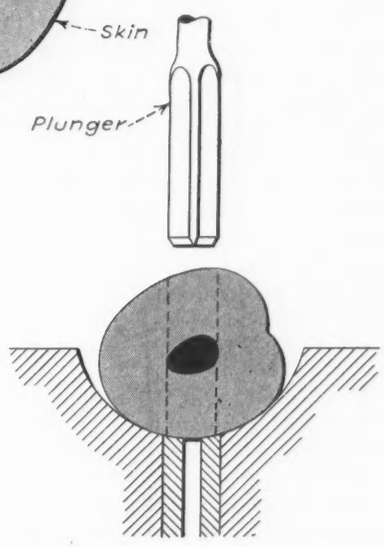


Fig. 2: Showing the principle by which cherries are mechanically pitted. The plunger is four-pointed, star-shaped, and pushes the pit out through the skin.

IN ADDITION to being eaten fresh, cherries are the raw material for canning, cherry preserves, jams, syrups, conserve and are also prepared by artificial color and flavor for garnishing appetizers, desserts and liquors. Despite the apparent widespread enjoyment of this fruit's flavor and the fairly long list of its uses, it is, nevertheless, considered by the preserve manufacturer to be a rather "poor seller." Perhaps the reason for this reputation is found in the real or fancied difficulties which preserve manufacturers experience in bringing to the consumer a truly delightful product.

All of the difficulties encountered in the manufacture of cherry products may be overcome with a reasonable amount of care and by the use of proper equipment. There are many kinds of cherries in existence, ranging in color from almost white with a pink cheek to such a dark red that it is almost black. Flavors range from sweet to very sour. Cherries that are most commonly used by preserve manufacturers are the medium dark red and in flavor are a little more than medium sour. Practically all preservers' cherries are of this one type and generally come to him with the stems off and the pits removed. In the trade they are designated only as R.S.P. Cherries, *i.e.,* Red Sour Pitted Cherries.

R.S.P. Cherries are prepared for market by removing the stems and pits and packing them in barrels with or without sugar so that they are labeled: "Straight" (without sugar), "Two-plus-One" (two parts of cherries to one part of sugar), "Three-plus-One" (three parts of cherries to one part of sugar), or "Four-plus-One" (four parts cherries to one part sugar). After packing into barrels it is necessary to hold them at reduced temperatures in exactly the same manner that is employed for other small fruits preserved by this method.

From the standpoint of the fruit preserver one of these packs is about as good as the other, with the slight advantage in favor of the Two-plus-One.

The common R.S.P. Cherry has a comparatively tough skin and a fairly large stone or pit. The space (Fig. 1) between the skin and the stone is filled with a soft, juicy pulp. For removing the pit, the common method is by means of the plunger type of pitter. The plunger, or "needle" enters the cherry at whatever side is uppermost in the pitting machine, and when it comes in contact with the pit, the plunger pushes it through the cherry and out the other side (Fig. 2). This operation results in some loss of juice and two ragged holes, one where the plunger enters the cherry and the other where the pit is forced out on the opposite side. Often there is a third hole where the stem is removed.

When the preserver starts with a torn cherry, there is no way to put it back together again, so that at the outset the problem looks hopeless.

A cherry preserve has no distinguishing characteristics recognized by the federal standards promulgated under the Food and Drug Law but, like all other preserves, it is required to be made by using not less than 45 lb. of fruit to each 55 lb. of sugar, cooked to a jam consistency of about 68 per cent total solids. The perfect cherry preserve would be composed of whole, plump cherries suspended in a very heavy cherry syrup, practically in a jelly.

As a general rule, a barrel of R.S.P. Cherries will not possess sufficient free juice to proceed with the cooking as is possible with most of the other small fruit.

In *open kettle* cooking, the customary procedure is to use what juice is available plus the amount of water necessary to cook up or dissolve the sugar in a boiling period of reasonable length ending at a temperature of about 240 deg. F. to 244 deg. F. Because 68 per cent of total solids means a boiling temperature of about 221 deg. to 223 deg. F., it is obvious that the object of the first cooking is to make a syrup so heavy that, when the cherries are thrown into the kettle, a very short cook will take care of this added water (cherry juice) and result in a preserve of the proper consistency without breaking the cherries any more than is necessary, nor cooking out the soft pulp from the cherries. The next operations involve proper cooling, packaging, followed by sterilizing to finish the open kettle preserve. However, in a "high cooked" open kettle preserve, there is nearly always universally present a certain amount of the flavor of caramel as a result of the breakdown of sugar at the higher temperatures. This flavor, though desirable in some foods, is not desirable in a preserve.

To avoid it, the rule is to cook under reduced pressure and consequently a reduced temperature of boiling.

IN a 400-lb. bbl. of Two-plus-One cherries there will be about 250 lb. of cherries and 150 lb. of sugar. Thus, to make a preserve from this quantity of Two-plus-One cherries, it will be necessary to add 150 lb. more of sugar to the contents of the barrel, making a total of 250 lb. of cherries and 300 lb. of sugar.

The fruit itself contains less than 100 lb. of insoluble solids, hence from the practical standpoint the fruit may be regarded as a reasonably dilute solution of sugar and water with very little solid material in it. This makes it necessary to concentrate the cherry syrup plus added sugar to such a point that, when the fruit itself is added to the thick syrup, a desirable preserve will ultimately result without any further cooking and with but very little more evaporation.

TO EXPLAIN the procedure the following theory is advanced. The weight of the juice drained from the amount used of Two-plus-One fruit minus the weight of sugar, supposedly in the pack, may be considered to be equal to the weight of water to be used in this calculation. The weight of sugar in the pack (whether it is still in the cherries or is in the separated juice) plus the weight of the sugar added equals the total amount of sugar. Water will need to be added to the light cherry syrup, drained from the fruit, in order to bring the added sugar into solution. Then the weight of juice drained from the fruit plus the weight of added water and added sugar equals the weight of material in the vacuum pan that must be concentrated. Its concentration must be carried to such a density that when the thin syrup, which is in the drained cherries and cannot be separated from them, is equalized by osmosis, after the drained cherries are placed in the heavy syrup in the pan, the net result will be a satisfactory preserve.

Thus, if approximately one-third of the total moisture in the barreled fruit can be poured off (leaving two-thirds inside the fruit), then to produce a good preserve by this method, the poured-off syrup plus the added sugar must be concentrated to 90 per cent of soluble solids before the fruit can be added. A concentration as high as that may be attained under reduced pressure in a vacuum pan without caramelization of the sugar.

Hence, the procedure is to drain the syrup from the Two-plus-One fruit, weigh it, and next draw it into a vacuum pan; then add the calculated amount of sugar to the syrup in the pan. Next, enough water is drawn into the vacuum pan and enough heat is applied to insure complete solution of the sugar. It should be remembered that, after concentration is under way, no more sugar will dissolve—apparently the evaporation is too rapid—and it seems to stay in the pan as wet sugar, and will persist as such when the product is filled into the jars. Therefore, when solution is complete, and at a temperature not over 160 deg. F., the vacuum is drawn on the pan and all available heat is applied to concentrate the syrup rapidly to 90 per cent soluble solids as determined by a refractometer.

At the desired concentration, the vacuum is broken, the batch of syrup brought to atmospheric pressure and the drained cherries added. The pan is closed again and the pressure reduced to the point where the batch begins to boil. Agitation is permitted for one minute only when the vacuum is broken again. At this point the pan and its contents remain idle while osmosis or diffusion of the sugar throughout the fruit takes place. Ordinarily the last step requires about a half hour. At the end of the period, another rolling agitation by vacuum may be endured by the fruit without injuring or breaking it.

The final step is testing the density of the syrup with a refractometer to determine the end point. In the absence of a refractometer, a Brix or Balling hydrometer will give a fairly good approximation. If the batch has turned out correctly, the contents of the pan are heated to a temperature of 190 to 200 deg. F. for filling into jars unless a cold fill is used with subsequent sterilization, in which case the preserves from the pan are ready for filling into jars without further heating.

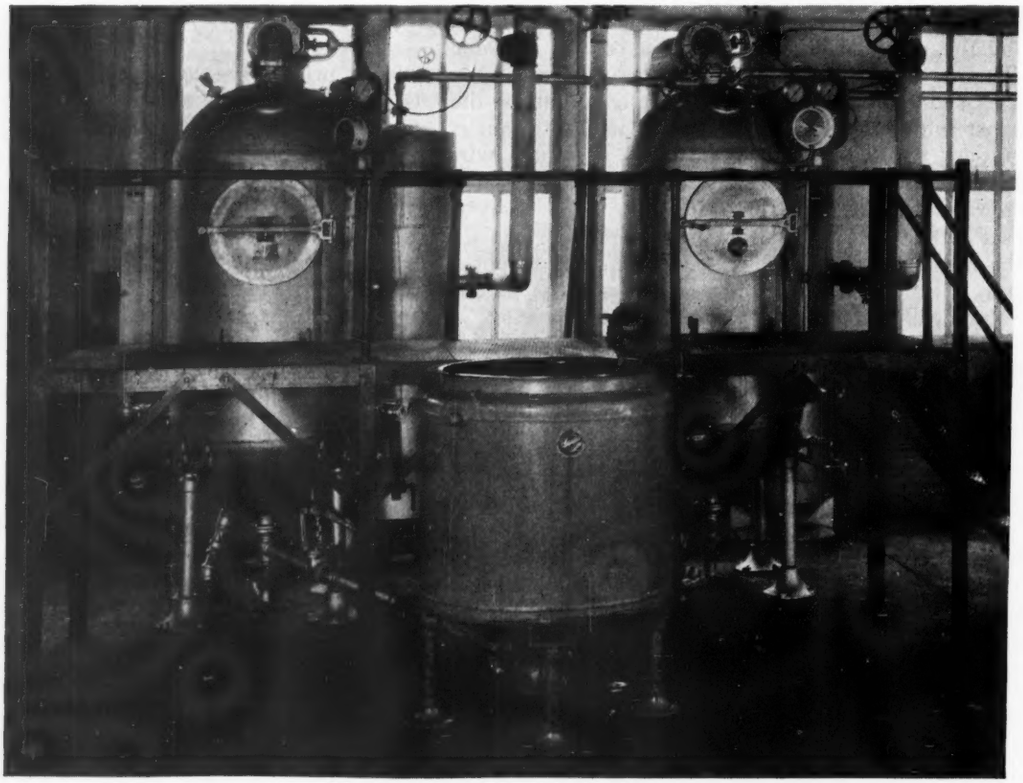


Fig. 3: Pair of Pfaudler vacuum pans in a preserve plant. Barometric condensers are outside the building and produce most of the vacuum.

Explosibility of Dusts in Food Plants

Maximum pressure and rate of pressure rise, shown by test, are indicators.

THREE hundred and eight deaths, 680 injured, and $34,212,629 damages to property make up the toll of the 380 dust explosions that occurred in American industrial plants from 1916 to 1934. These, and other facts that follow, are quoted from Technical Bulletin No. 490, U. S. Department of Agriculture, by Paul W. Edwards and L. R. Leinbach, of the chemical engineering division of the Bureau of Chemistry and Soils.

Dust explosions have occurred in practically all grain-handling and processing industries and also in such food manufacturing plants as sugar refineries, powdered milk plants, and many others. In order to determine the explosibility of various dusts, tests were conducted by the Bureau of Chemistry and Soils. These were of two types: small laboratory-scale tests in a closed system; and large-scale tests in an open system.

A dust explosion consists essentially of pressure produced by the rapid burning of dust suspended in air. This pressure, and the rate of its rise, are responsible for the damage caused by the explosion. The rate of burning of the dust cloud is affected by the size, the ease of ignition, and the heat of combustion of the dust particles, and also by the concentration of the dust in the air.

Two concentrations of the various dusts tested were used in this investigation: 100 milligrams of dust per liter of air, and 500 milligrams per liter. These were equivalent to 100 oz. and 500 oz. per 1,000 cu.ft., respectively.

Ratings of Explosibility of Food Dusts Based on averages of classes as regards maximum pressure, average rate of pressure rise, and maximum rate of pressure rise

(Maximum explosibility = 100, minimum explosibility = 0)

Material	Concentration of 100 mg. per liter	Concentration of 500 mg. per liter	Average of both concentrations
Agar	50	57	53
Alfalfa	33	37	35
Allspice	37	40	38
Blood flour, soluble	60	63	62
Bone, raw	57	57	57
Bone, steamed	0	7	3
Bran	7	37	22
Buttermilk, powdered	43	47	45
Cardamon seed	33	53	43
Casein	57	53	55
Cinnamon	90	63	77
Cloves	40	37	38
Cocoa	10	27	18
Corn meal, yellow	27	47	37
Cottonseed meal	13	23	18
Cracker meal	40	53	47
Dextrin	43	63	53
Dextrose	47	53	50
Egg albumen	23	37	30
Elevator dust			
Barley	27	43	35
Corn	70	70	70
Oat	50	50	50
Wheat	50	70	60
Fish meal	33	43	38
Flour			
Barley	43	60	52
Buckwheat	33	50	42
Hardwinter wheat	53	57	55
Rye	53	60	57
Softwinter wheat	53	50	52
Soybean	37	30	33
Spring wheat	47	50	48
Tapioca	63	63	63
Whole wheat	37	47	42
Gelatin	70	(no test)	70
Ginger	17	40	28
Gluten meal	40	43	42
Lactose	30	23	27
Levulose	47	70	58
Malt	57	50	53
Milk, powdered, skim	67	53	60
Milk, powdered, whole	37	40	38
Nutmeg	53	57	55
Oat dust from dry kiln	67	73	70
Paprika	50	50	50
Pectin	37	47	42
Pepper, black	60	57	58
Sage	60	50	55
Starch, corn	63	77	70
Starch, potato	50	63	68
Starch, rice	73	63	68
Starch, wheat	47	67	57
Sucrose	53	47	50
Tea fluff	53	47	50
Wheat smut, No. 1	47	53	50
Wheat smut, No. 2	53	(no test)	53

The laboratory tests were made in a closed gastight bomb. The large-scale tests were made by the so-called open system. This system consists of a gallery, with at least one opening through which the explosion is vented without damage. In this system the explosibility of a dust is determined by the length of flame produced when the dust cloud in the gallery is ignited, or by the quantity of inert dust required to prevent or limit the propagation of flame.

Maximum pressure, average rate of pressure rise and maximum rate of pressure rise, at both concentrations, were assumed to be of equal value as criteria of explosion hazard. This assumption is, of necessity, rather arbitrary, as in an actual dust explosion these variables are affected by many factors, such as concentration, size and distribution of dust particles, size and shape of structure in which the explosion occurs, atmospheric humidity, and size and temperature of the ignition source. These factors may alter the maximum pressure and rate of pressure rise in various ways, as is shown in these tests in the case of concentration. Hence the ratings as determined apply only to the conditions under which the tests were made. However, all the tests are comparable.

On the basis of the test results, covering 133 different dusts, the dusts were rated as to explosibility on a basis of maximum explosibility=100, minimum explosibility=0. The tabulation that is given in the adjoining column shows the ratings of the principal food dusts included in the tests.

Malting Is More Than the Sprouting of Barley

Part Two

By HEINRICH LUERS

München, Germany

IN PART ONE of this paper, FOOD INDUSTRIES, pp. 126-128, March, 1936, were discussed the carbohydrate-splitting enzymes found in malt. Attention is now directed to the proteases, esterases, and phosphatases.

As a group the proteases are at least as important as the carbohydrases because such properties as body, head, sediment, and turbidity of beer depend upon the correct degradation of the malt proteins. In fact, research workers have been greatly concerned with the degradation of proteins during malting and only recently have the perplexing views of earlier workers been clarified—thanks to progress made in our knowledge and to refinement of analytical technique and methods of malt preparation.[5]

Studies by recent research workers evidence that in malt exists a protease with a pH optimum of about five and at least two different peptidases.[2, 6, 7, 8, 9, 10, 11] The proteinase of barley and malt is of the papain type and can be activated by hydrocyanic acid. The optimum activity of the peptidases is obtained under neutral to slightly acid conditions. Method for separation of these peptidases in sprouting grain has been the basis of interesting studies.[12]

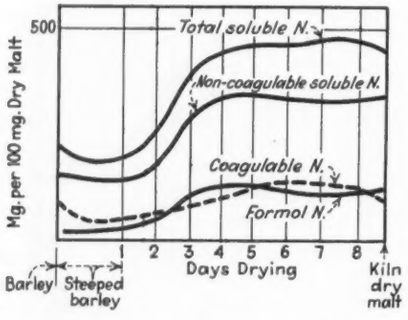


Fig. 1: Effect of Malting on Nitrogen Constituents of Barley.
Analytical determination of changes taking place in the organically combined nitrogen constituents of barley during malting serves as a means of identifying the proteases present.

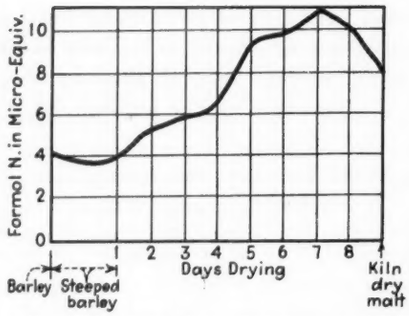


Fig. 2: Peptidase Activity During Malting.
Increase in concentration of a specific peptidase during malting is indicated by a marked increase in formol nitrogen prior to destruction of the enzyme; a sharp decrease follows the destruction of the enzyme.

Analytical determination of these enzymes is made by the use of such substrates as gelatin, edestin, or dipeptides, and constitutes the foundation of our scientific knowledge. However, for practical interpretation these methods are not suitable. For practical interpretation the natural substrate, or still better, the germinating grain itself, must be considered. Also, an attempt must be made to get an insight into the proteolysis by means of convenient and practical methods of differentiating organically combined nitrogen, which will permit such an estimation to be made. Unfortunately, extraordinarily tedious methods[13] are unsuited to the requirements of technology. Substantially simpler methods[14, 15] are to be preferred, even though they may still appear too complicated for the control laboratory. In general, determination of the simple fractions, permanently soluble and coagulable nitrogen and formol titration, is sufficient to judge the degree of proteolysis. These fractions have recently been used by the European research laboratories in increasing numbers. Changes in these nitrogen constituents during the malting process have been analytically determined.[4] The results are summarized in Fig. 1.

An estimation of the total degree of proteolysis brought about principally by protein degradation, is obtained from the increase in soluble nitrogen; such increase is known to be quite considerable. For this purpose the variations in coagulable nitrogen are of much less significance. The formol titration fraction increases greatly as a result of the more extensive breakdown by peptidases. That these large increases are actualy accompanied by an increase in the concentration of the corresponding enzyme has been shown by determining the formol titration before and after the destruction of the enzyme,[4] as shown in Fig. 2, concentration decreases after seventh day.

Nitrogen determined by formol titration serves as a measure of the low - molecular - weight, highly - degraded nitrogen compounds of the malt. However, we must not conclude that they are represented only by free amino acids because the amino nitrogen of di- and polypeptides is also titrable. Quantitative determination of the amino acids, cystine, tyrosine, and trytophane in the

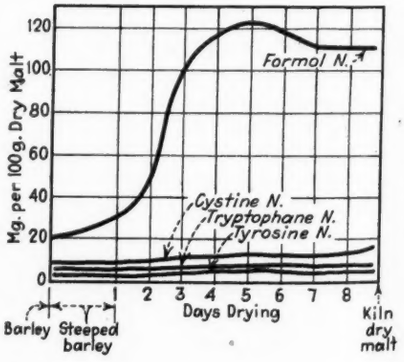


Fig. 3: Comparative Increases in Protein Degradation Compounds Produced During Malting.
Concentration of such amino acids as cystine, tyrosine, and tryptophane also increases during malting. The rate of their increases is quite different from that of the protein degradation products represented by the formol nitrogen determinations.

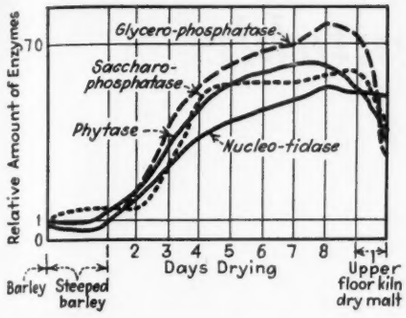


Fig. 4: Phosphatases Produced in Barley During Malting.
Increase in the concentration of phosphatases during malting result in increased production of inorganic phosphates from organic phosphoric acid esters.

cold water extract of the malt by a new colormetric method indicates the extent of increase in free amino acid content. The increase in concentration of these free acids is not significant except that it is quite different from and remains much less than that indicated by the formol titration (Fig. 3).

As with the carbohydrases, kiln drying has a destructive effect on the proteases, which is much more pronounced because of the greater sensitivity of proteases to heat. In addition, drying causes considerable change in the nitrogen compounds as a result of chemical reactions such as coagulation of proteins, combination of amino nitrogen and sugars to form melanins.[16, 17] However, these changes are outside our consideration.

We also observe that the amount of proteases in malt depends upon the length of germination and the temperature. A cool malting gives a higher proteolytic activity in the malt than a warm one.[18] Moreover peculiarities of the crop year produce a marked effect, as the technologist well knows. "Heating" of barley is a phenomenon which for the most part is connected with the kind of nitrogen compounds in the grain and the enzymic transformation during sprouting.[19, 20]

In concluding this discussion of proteases it might be mentioned that the analytical estimation of a few easily determinable nitrogen fractions gives the technologist a means of judging the correct course of proteolysis.[15, 21, 22] Without going into detail the following figures for an easily soluble brilliant malt can be designated as normal:

Soluble N: 30.5-33.5 per cent of total N. determined in cold water extract.

Coagulable N: 7.5-8.5 per cent of total N. determined in cold water extract.

Permanently Soluble N: 22.5-26.0 per cent of total N. determined in cold water extract.

Formol N: 10.5-12.5 per cent of total N. determined in wort.

Along with carbohydrases and proteases, the esterases demand our attention, because they give rise to

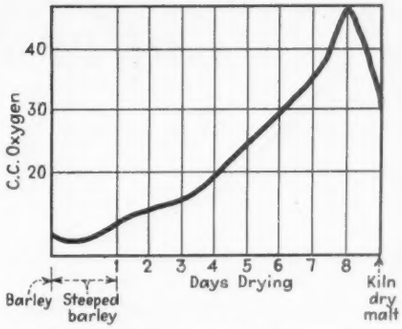


Fig. 5: Catalase Activity During Malting.
As malting progresses the hydrogen peroxide-splitting enzyme concentration shows a rapid increase prior to the destruction of the enzyme by kiln drying.

inorganic compounds, particularly phosphoric acid, which serve as buffers and yeast foods. Characteristic esterases of the lipase type which split the true fats are undoubtedly important for nutritional processes, including the translocation and metabolism of fats. Little is known about these enzymes in the germinating grain,[23, 24] because investigations have been confined to the qualitative and quantitative changes which the fat undergoes from barley to malt.[25, 26] However, the phosphatases are well known.[27, 28] Fig. 4, shows that the phytase, glycero-phosphatase, nucleo-

(Turn to page 204)

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Coffee Staling IS Preventable

A Letter to the Editor of FOOD INDUSTRIES

A READER of the article by Dr. Robert O. Bengis, entitled "Coffee Staling Unpreventable," appearing on page 490, October, 1935, FOOD INDUSTRIES would undoubtedly get the impression that the vacuum method of packing coffee is of very little value. This might result from several ambiguous statements made by Dr. Bengis, whose work is financially supported by a coffee company which does *not* use the vacuum-packing method, and whose paper seems to consist mainly of an attempt to discredit the high-vacuum method of packing. These statements are—

1. The paragraph beginning "In the experiments carried out at Yale University" states that a comparison was made between the fat fraction extracted from a fresh roast and one extracted from the same coffee after aging—the former being described as full-bodied and fragrant and the latter flat, rancid and disagreeable. In this experiment the flavor-producing substance in the coffee was extracted along with the vegetable fat or oil which is present in the product. Now, only the former—the flavoring substance, is concerned with the flavor of a brew made from the coffee. The fat is not water-soluble and, as far as the writer has been able to observe and learn, contributes nothing to the flavor of the brew. Hence, to confuse the fat with the flavoring substance, does not give a true picture of what the consumer will get in his cup of beverage.

The fat in coffee will react, of course, with atmospheric oxygen. Indeed, the writer has an experiment which has been running about two years, during which a pound of coffee has absorbed over four liters of pure oxygen. And doubtlessly the fat in such a sample is very rancid. However, Professor S. C. Prescott of the Massachusetts Institute of Technology, who is also carrying on research work on coffee, states—in his article in Ukers' book, *All About Coffee*—that they "were unable to secure any evidence that the fat was responsible for the rancidity of coffee." In this case he apparently is using the term "rancidity" to mean "staleness." Hence, rancidity of the fat of coffee—when it does occur—does not cause the "stale" flavor of old coffee.

2. In the paragraph beginning "Here also it was definitely shown that oxidation takes place . . ." Dr. Bengis states that—while it is less marked—oxidation does occur in vacuum-packed coffee. While this statement is literally true, it does not give the reader any idea of the relative extent of oxidation in the two cases.

In the former case the coffee, we assume, was freely exposed to the air, probably in a ground condition and for some time (Dr. Bengis does not mention how long). In the latter the coffee was confined in an air-tight can in the presence of a very small amount of air (I am assuming he is discussing the commercial high-vacuum process, where the air removal is approximately 95 per cent or better). In the one case the amount of oxygen available to react with materials in the coffee, was unlimited. In the latter case, the amount of oxygen was extremely small—somewhere around 5 cc.—certainly not over 10 cc. (This figure is based on the average value of 650 cc. for the free gas space in the ordinary 1-lb. vacuum can packed with coffee.) Now, the experiments described by Punnett and Balart in their article, "Keeping Qualities of Vacuumized Coffee," *Tea and Coffee Trade Journal*, Vol. 70, p. 16 (Jan., 1936), demonstrate that this small loss of the flavoring material present is about a 2.5 per cent loss, to be exact, and is one which is barely perceptible to the taste sense of a highly trained expert coffee taster. This small difference obviously is imperceptible to the consumer, and is of no practical importance.

3. The last sentence in this same paragraph states that there is a "possibility" that the oxygen which forms a part of the coffee is brought into reaction within the vacuum package by a catalytic action. While such a reaction might be "possible" by a large stretch of the imagination, Dr. Bengis mentions no evidence for it, and we must conclude this statement is merely a bit of "thobbing," or wishful thinking on his part.

4. The last paragraph of the article is in the nature of a summary composed of incomplete and erroneous statements. For it is possible to inhibit the chemical changes in coffee—though not practically feasible to prevent them completely. The high-vacuum type package does not merely *retard* oxidative changes—it prevents all but an inconsequential loss in flavor and it prevents *all* development of staleness. As far as all *practical* purposes are concerned this method does fully preserve the original flavor and aroma of freshly roasted coffee.

5. Throughout the article Dr. Bengis seems to use the word "staling" or "staleness" to describe any and all oxidative changes which may occur in coffee under any conditions. While he, of course, is entitled to give any meaning he chooses to words for his own private use—in public print the reader has a right to expect a term to be used in the generally accepted sense unless a special definition is given in the text. In the case of coffee the term "staleness" is generally understood to refer to the peculiar and disagreeable flavor that appears in coffee some time after roasting. For instance, in the case of ground coffee it generally takes nine or ten days' exposure before the "stale" flavor first becomes apparent. This flavor is entirely distinct from that present in a freshly roasted sample. Therefore, the use of this term in referring to all oxidative changes occuring in coffee under any conditions is misleading. "Staleness" in coffee is a result of oxidation—but all oxidation does *not* result in "staleness." There is no "stale" flavor in coffee until a certain stage of oxidation is reached—just as there is no "rancidity" in a fat until the induction period of oxidation has been passed.

To conclude, the high-vacuum method of packing coffee *does prevent* "staleness" as long as the can is tightly sealed.

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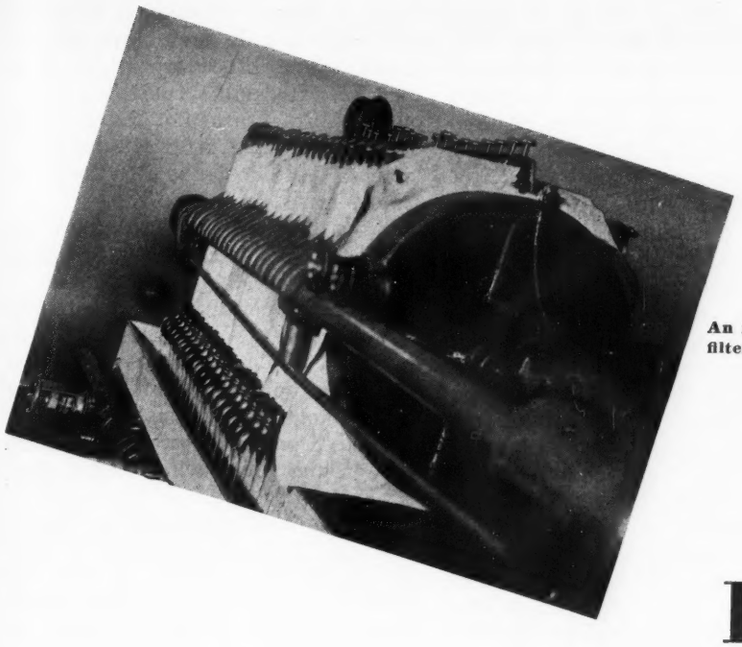
Method of manufacturing lard combines several unit processes and operations into a simple, foolproof system at this plant



An important step in the manufacture of lard, pressure filtering removes sediment which would impair keeping quality.

Difficult Production Job Made Easy

By A. H. MERKEL
Vice-President, Merkel, Inc.
Jamaica, N. Y.

PRODUCING a good product month after month, with economic utilization of byproduct materials, with low operating costs and without either a skilled operator or a control chemist requires a good system. Especially is this true when the product happens to be lard, because this most important byproduct of the meat packing industry is a delicate substance, and some ways of making it are quite complicated.

Such a simplified system, involving the unit processes and operations of cooking, pressing, filtering, pumping, chilling and packaging, is used in the plant of Merkel, Inc., Jamaica, N. Y., as well as in other meat plants throughout the country.

Merkel produces lard by the dry-rendering process, operating two 4x10-ft. steam-jacketed, insulated cookers to make 40,000 to 50,000 lb. of lard a week. Beginning with the process on the cutting floor, the raw materials, including not only leaf lard, back fat and the usual edible trimmings in a pork plant, but also the edible bones, are collected together at the cooker charging inlets. When it comes time to render a batch, the man operating the lard department and two helpers dump the materials into the cooker inlet, employing a funnel-shaped, portable chute to avoid spilling and to speed up the operation. This chute is supported on four legs in the manner of a table. About fifteen minutes is required for charging a cooker to its 4,000-lb. capacity.

It is not necessary to hash the raw material before cooking, and this, together with the fact that edible bones can be used, makes for saving in time, labor and machinery and also for complete utilization of the byproduct material.

Merkel does not hold the raw materials any longer than it takes to accumulate enough for one cooking, a precaution necessary if the free fatty acid content of the finished product is to be kept low. And going back even further in the steps taken to keep the acid content minimized, the carcasses are chilled quickly after slaughter and are taken as soon as possible to the refrigerated cutting department. Merkel slaughters in a plant on the North River in Manhattan, killing about 3,000 hogs a week, and it transports the carcasses by truck to the Jamaica plant, a distance of some 12 miles.

While the cookers are being charged and throughout the cooking process, an agitator with arms extending to the circumference of the horizontal cooking tank is kept in motion to prevent the material from sticking, this agitation also giving efficient heat transfer and uniform cooking. A 15-hp. motor drives the agitator at about 50 r.p.m. through a silent chain drive.

No particular skill is required to complete the rendering with this method. One man does this and has time enough to handle two cookers, the press, pumps, filter and agitator. This individual, who may be any intelligent man with a couple of weeks of training in handling the operations, functions principally on a time, pressure basis. He cooks the batch with a pressure of 45 lb. per sq.in. in the steam jacket, which is approximately 275 deg. F. After the fats have been 45 minutes in the cooker, he starts up a vacuum pump, which is a 4½x6x8-in., steam-jet condensing unit, to pull a 30-in. vacuum on the cooker, the vacuum being maintained until cooking is completed. There are two vacuum pumps, one for each cooker.

The total time required for rendering varies from three to four and one-half hours, depending upon the

type of the raw material. The higher the proportion of bones, for example, the longer the process must continue. When the man in charge thinks the rendering is about complete, he draws a test sample from the tank through a special valve and notes the condition of the cracklings. When these are dry and crisp, the process has been carried far enough.

THE purpose of cooking under vacuum is to remove the moisture from the lard, which is essential if good quality is to be obtained and the free fatty acid content of the lard is to be kept at the desired level.

When the fats have been rendered long enough, the operator opens a door in the front of the cooker and draws the batch into a perforated steel drain pan which sets in the top of a 4x3½x14-ft. steel receiving tank. A metal chute under the end of the cooker directs the product into the pan, where the cracklings are retained. The lard which passes through into the receiving tank is transferred within a few minutes to a 4,000-lb. agitator tank by a rotary pump.

Meanwhile, the operator slides the drain pan endways in the receiving tank until it is in position alongside a 150-ton crackling press. Then he shovels the cracklings into the press in batches of 200 to 300 lb., closes the unit and starts the hydraulic pump to apply the pressure, the pump being a 5½x¾x7-in. steam unit. About half an hour is required for the pressing operation, and the lard freed from the cracklings drains into a small tank where it is picked up by the same rotary pump which conveys the receiving tank lard to the agitator tank.

The agitation, effected by a small, high-speed, propeller type unit located near the bottom of the tank, uniformly mixes the lard with any solid material that remains in it and prepares the product for the next operation—filtering. To prevent the temperature from dropping too low for effective filtering, the agitator tank is equipped with a steam-jacketed bottom, and the lard is kept at 130 deg. F.

The lard does not remain more than 20 minutes, on the average, in the agitator tank before it is delivered under a pressure of 50 lb. per sq.in. through an 18-in., 20-plate filter press. The pump supplying the filter is a 4½x3x4-in. duplex steam unit with duck packing on the lard end.

NO FILTER-AID or fuller's earth is used in refining lard under this process. It is merely passed through the pressure filter, the plates of which are covered with two thicknesses of heavy duck cloth. About 4,000 lb. an hour can be clarified.

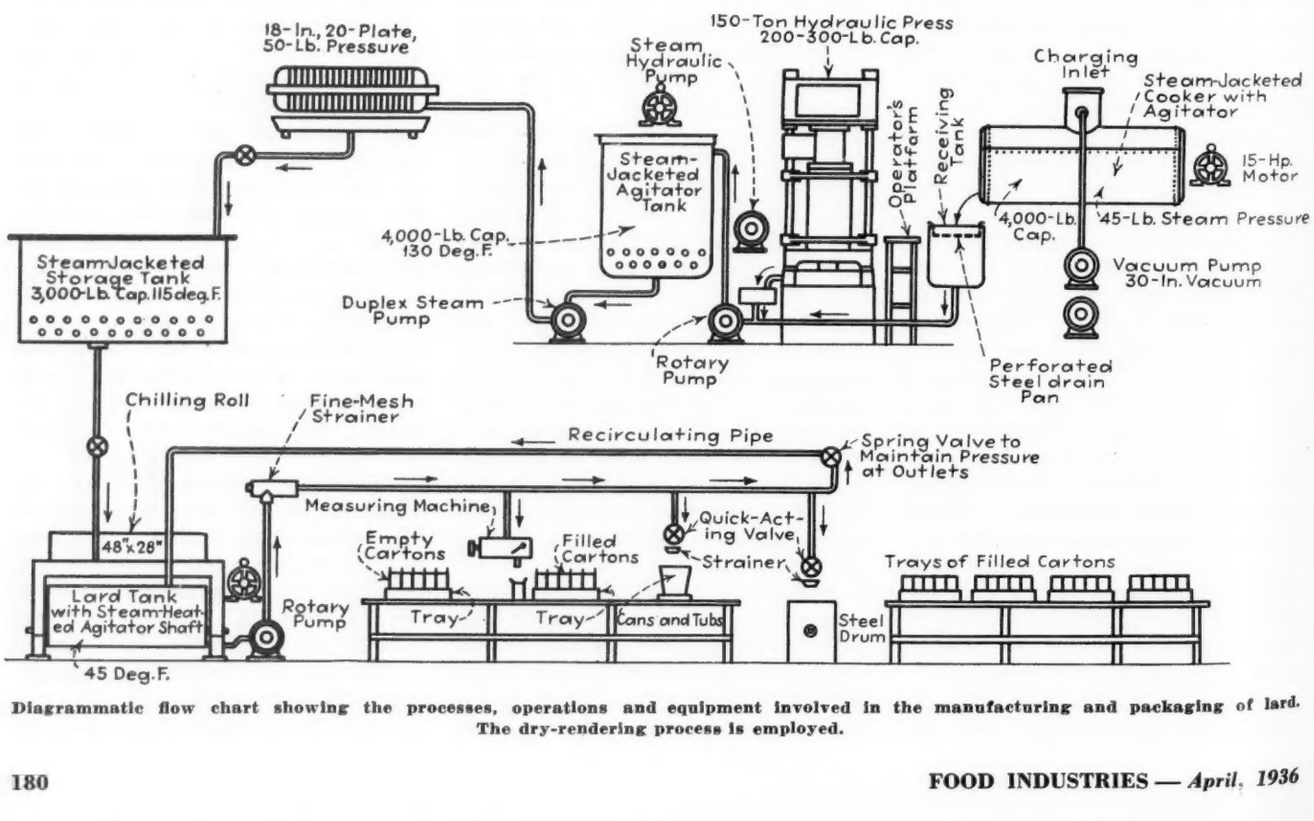
Filtering is important, since any sediment remaining in the lard impairs its keeping quality. And care is taken to keep the filter cloths clean and to avoid the use of cloths with holes in them. Workmen take the press apart daily and clean all the cloths. The procedure is to soak them in water and scrub them vigorously with a brush, hot water and a detergent having a trisodium-phosphate base. The cloths then are thoroughly rinsed and dried.

From the filter the lard flows by gravity into a so-called storage tank which has a steam-jacketed bottom to keep the temperature of the product at 115 deg. F. While the tank holds 3,000 lb., the lard is not kept long in it, because holding would increase the acid content of the finished product. Instead, it passes directly to a chilling roll on the floor below, being conveyed by gravity.

Chilling also represents an important step in the manufacture of lard, the object of it being to cool the product before the stearine forms large crystals. While crystals do form in the process, these are so small that grain is quite fine. Furthermore, the absence of a chilling roll often results in trouble with soft, mushy lard, especially during the warm months.

To effect the chilling, the hot lard flows into a compartment where it is picked up on an iron drum, the Merkel unit having a 48x28-in. cylinder refrigerated with direct-expansion ammonia coils. After one revolution, the lard is reduced to a slush with a temperature of 45 to 50 deg.

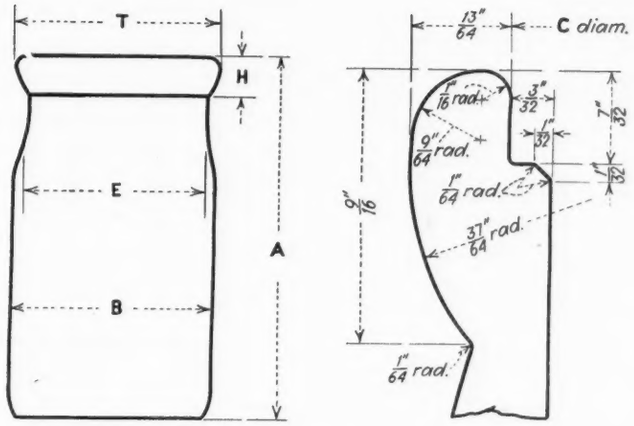
(Turn to page 210)



Diagrammatic flow chart showing the processes, operations and equipment involved in the manufacturing and packaging of lard. The dry-rendering process is employed.

Food Industries Data Sheet

Simplified Containers for Dairy Products



Glass Container Association No. 575 glass finish for cottage cream jars.

PASSAGE of the United States Container Act in 1916 started a federal activity which has done much to lower container costs for food processors and manufacturers as well as to clarify merchandising problems.

To promote the development and adoption of standard containers on a voluntary, cooperative basis, the Division of Simplified Practice was set up in the Bureau of Standards, U. S. Department of Commerce, to work with representative food manufacturers, container manufacturers, and others interested in the promulgation of simplified practice recommendations covering details of specifications such as dimensions, capacities and similar basic factors in container design.

Through general conferences of the industries affected, and joint meetings of the standardization committees of associations authorized to act for the industries, containers of specific types and specifications were accepted and approved for promulgation by the Bureau of Standards as being standard containers for the packing and shipping of each class of food.

In setting these standards, particular effort has been made by the Division of Simplified Practice to have the specifications conform to the best current practice in the industry affected. The material that follows presents briefly the standards adopted to date for use in the dairy products industry.

For ice cream brick molds and cartons the following original recommendations became effective as of Jan. 1, 1931. (S.P.R. No. 120-31.)

Dimensions of Two-Gallon Ice Cream Mold

Length	Width	Depth
26 in.	6½ in.	2⅞ in.

Machine-Filled Cartons

Pint:	(Dimensions in Inches)
No. 1 U.S. Standard	$3\frac{3}{16}$ x $3\frac{1}{4}$ x $2\frac{1}{16}$
No. 2 U.S. Standard	$2\frac{7}{16}$ x $3\frac{1}{4}$ x $3\frac{1}{16}$
Quart:	
No. 1 U.S. Standard	$2\frac{1}{16}$ x $3\frac{1}{4}$ x $6\frac{1}{4}$
No. 2 U.S. Standard	$2\frac{7}{16}$ x $3\frac{1}{4}$ x $7\frac{1}{4}$

Note:—The above sizes of cartons include a margin of oversize to allow for the heaviest paper liner commonly used, which is known as 40-lb. stock, based upon 480 sheets, or one ream, measuring 24x36 in.

In 1935 the following revision was proposed for machine-filled ice cream cartons and is still before the industry for action:

Pint:		(Dimensions in Inches) Height	Length	Width
With Liner	No. 1 U.S. Standard	$2\frac{1}{16}$	$3\frac{3}{16}$	$3\frac{1}{4}$
With Liner	No. 2 U.S. Standard	$2\frac{7}{16}$	$3\frac{1}{16}$	$3\frac{1}{4}$
Linerless	No. 1 U.S. Standard	$2\frac{1}{16}$	$3\frac{1}{4}$	$3\frac{1}{4}$
Linerless	No. 2 U.S. Standard	$2\frac{3}{16}$	$3\frac{7}{32}$	$3\frac{7}{32}$
Quart:				
With Liner	No. 1 U.S. Standard	$2\frac{1}{16}$	$6\frac{1}{4}$	$3\frac{1}{4}$
With Liner	No. 2 U.S. Standard	$2\frac{7}{16}$	$7\frac{1}{4}$	$3\frac{1}{4}$
Linerless	No. 1 U.S. Standard	$2\frac{1}{16}$	$6\frac{7}{32}$	$3\frac{1}{4}$
Linerless	No. 2 U.S. Standard	$2\frac{3}{16}$	$7\frac{7}{32}$	$3\frac{7}{32}$

Original recommendations covering ice cream cups and cup caps became effective Jan. 1, 1932. (S.P.R. No. 132-32). They are:

Capacity	Designation	Cap Diameter[1] Inches
½ pt.	Commonly known as 5-c. size	[2]
½ pt.	Commonly known as 10-c. size	2.750
½ pt.[3]	Intermediate	3.280
½ pt.[3]	Tub	3.654
1 pt.[3]	Intermediate	3.622
1 pt.[3]	Tub	4.372
1 qt.	Intermediate	4.372

[1]A tolerance of 0.004 in. ± is to be allowed in manufacturing caps for cups included in the simplified list.

[2]No cap diameter specified for this size of cup.

[3]The intermediate and tub shapes are to be recognized as standard packages for the ½ pt. and 1 pt. sizes of cups until such time as preference for one shape is expressed by the industry.

Food Industries Data Sheet

Proposed revision before the industry provides for the dropping of specifications covering the $\frac{1}{6}$ and the $\frac{1}{4}$ pt. cups.

Another simplified schedule of standard stock types, sizes and dimensions before the affected industries is that pertaining to tinned steel ice cream cans. They are:

High Type, 5 Gal. (20 Qt.)

Height: (Outside, including up-set bottom but not including cover).. 20⅛ in.
Diameter: (Inside, measured 1 in. below rim)..... 8½ in.
Cover: Flat top type with or without handle.

Low Type, 5 Gal. (20 Qt.)

Height: (Outside, including up-set bottom but not including cover).. 18½ in.
Diameter: (Inside, measured 1 in. below rim)..... 9 in.
Cover: Flat top type with or without handle.

High Type, 2½ Gal. (10 Qt.)

Height: (Bottom to top of can, not including cover or buttons)..... 10 $\frac{5}{16}$ in.
Diameter: (Inside, measured 1 in. below rim)..... 8½ in.
Cover: Flat top type with or without handle.
Bottom: Flat with buttons optional.

Low Type, 2½ Gal. (10 Qt.)

Height: (Outside, bottom to top of can, not including cover or buttons) 9½ in.
Diameter: (Inside, measured 1 in. below rim)..... 9 in.
Cover: Flat top type with or without handle.
Bottom: Flat with buttons optional.

High Type, 1 Gal. (4 Qt.)

Height: (Outside, including up-set bottom but not including cover) . 11 $\frac{5}{16}$ in.
Diameter: (Inside, measured 1 in. below rim)..... 5½ in.
Cover: With or without handle.

Also effective Jan. 1, 1932, were the recommendations covering wooden butter tubs. These specifications have subsequently been reaffirmed by the Standing Committee on Simplified Practice. (S.P.R. No. 135-32.)

Wooden Butter Tubs

(Dimensions in Inches)

Capacities (in pounds)	Inside diameter: Bottom	Inside diameter: Top	Inside vertical depth	Outside length of stave
63 to 64	12⅛	14½	13⅛	14 $\frac{5}{16}$
33	9 $\frac{5}{16}$	12	11 $\frac{5}{16}$	12
10	6 $\frac{5}{16}$	8½	7½	8

Recommendations on glass containers for cottage cheese and sour cream became effective Jan. 1, 1933, and are still in effect. (S.P.R. No. 148-33.)

Glass Containers for Cottage Cheese and Sour Cream

Capacity (Fl. oz.)	Base diameter (Inches)	Height of bottle (Inches)	Height of finish (Inches)	Cap seat diameter (Inches)	Over-all diameter finish or roll (Inches)
8	2⅛	3⅛	$\frac{5}{16}$	2⅛	2 $\frac{13}{16}$
12	3	5 $\frac{5}{16}$	$\frac{5}{16}$	2⅛	2 $\frac{13}{16}$
16	3 $\frac{5}{16}$	6	$\frac{5}{16}$	2⅛	2 $\frac{13}{16}$

Glass Container Association No. 575 Glass Finish

Cottage Cheese Jar Finish (S.P.R. No. 148-33)
(Dimensions in inches)

No. or Size	A	B	C	E	T: Max.	T: Min.	H	Weight (oz.)
8 oz.	3⅛	2.875	2.375	2.500	2.781	2.751	$\frac{5}{16}$	10
12 oz.	5 $\frac{5}{16}$	3.000	2.375	2.500	2.781	2.751	$\frac{5}{16}$	15½
16 oz.	6	3.062	2.375	2.500	2.781	2.751	$\frac{5}{16}$	15½

Simplified practice recommendations covering milk and cream bottles and bottle caps were among the first promulgated by the Bureau of Standards. The original recommendations were revised and made effective as of March 1, 1927. They are still in effect. (S.P.R. No. 10.)

Table I: Sizes of Milk and Cream Bottles

Capacity	Weight (Oz.)	Over-all height (Inches)	Outside diameter of body (Inches)	Diameter cap seat (max.) (Inches)	Outside diameter of neck (Inches)	Outside diameter of roll (Inches)	Depth of roll (Inches)
Quart	25½	9⅛ or 9⅜	3 $\frac{11}{16}$	1 $\frac{49}{64}$	1 $\frac{49}{64}$	2½	$\frac{11}{64}$
Pint	15½	7⅛	3 $\frac{1}{16}$	1 $\frac{33}{64}$	1 $\frac{13}{64}$	2½	$\frac{11}{64}$
Half-pint	10	5⅛	2½	1 $\frac{13}{32}$	1¼	2 $\frac{9}{16}$	$\frac{5}{16}$

Table II: Size of Milk and Cream Bottle Caps[1]

Size number	Die Diameter (Inches)	Thickness of paper board (inches)
No. 2	1 $\frac{53}{64}$	0.035–0.040

[1]One size of cap will meet the requirements for the four varieties of bottles shown in Table I.

Glass Container Association No. 500 Glass Finish

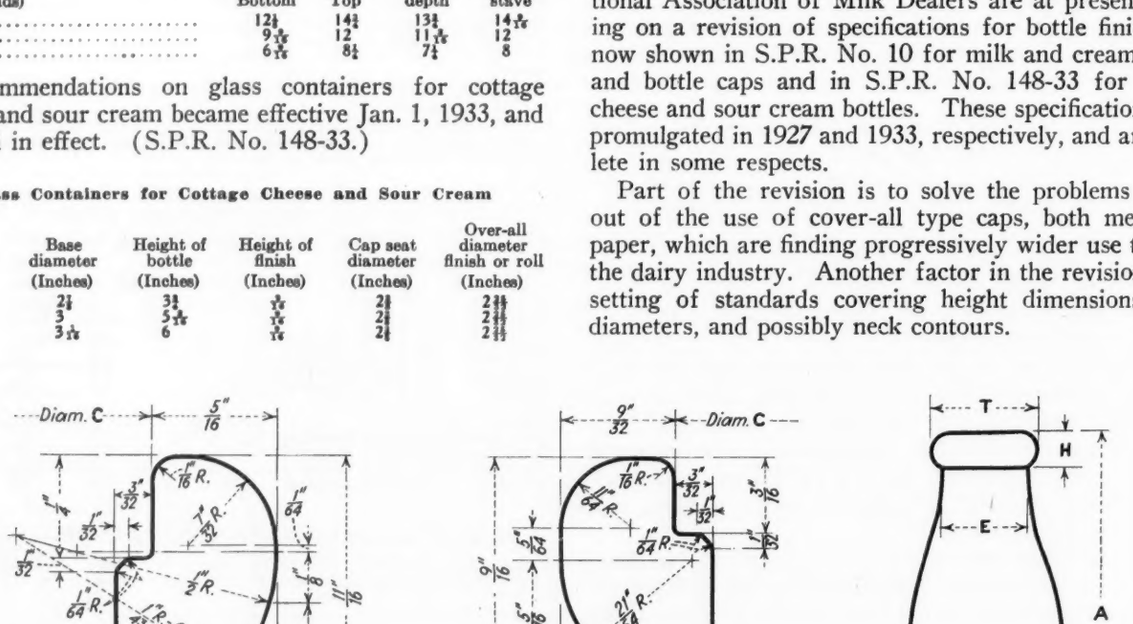
Milk Bottle Glass Finish (S.P.R. No. 10)
(Dimensions in Inches)

No. or Size	A	B	C	E	T: Max.	T: Min.	H	Weight (oz.)
Half-pint	5⅛	2.500	1.656	1.750	2.197	2.167	$\frac{5}{16}$	10
Pint	7⅛	3.062	1.656	1.812	2.260	2.230	$\frac{11}{16}$	15½
Quart	9⅛	3.812	1.656	1.906	2.260	2.230	$\frac{13}{16}$	25½
Quart	9⅜	3.812	1.656	1.906	2.260	2.230	$\frac{13}{16}$	25½

All bottles are to be finished for No. 2 Cap (1 $\frac{53}{64}$ diameter).

The Simplification and Standardization Committee of the Glass Container Association of America and International Association of Milk Dealers are at present working on a revision of specifications for bottle finishes, as now shown in S.P.R. No. 10 for milk and cream bottles and bottle caps and in S.P.R. No. 148-33 for cottage cheese and sour cream bottles. These specifications were promulgated in 1927 and 1933, respectively, and are obsolete in some respects.

Part of the revision is to solve the problems arising out of the use of cover-all type caps, both metal and paper, which are finding progressively wider use through the dairy industry. Another factor in the revision is the setting of standards covering height dimensions, body diameters, and possibly neck contours.



Glass Container Association No. 500 glass finish for quart, pint and half-pint milk bottles.

Various types of conveyor, truck and tray dryers are receiving increased attention from food engineers as their advantages of close control of temperatures, circulation of air and drying time become more widely known in the food industries.

Drying Foods

With Non-Rotary Air Dryers

By BIRNEY MILLER
Industrial Engineer, Larchmont, N. Y

USE of air dryers of the non-rotary type in the different branches of food processing is being extended each year because they offer possibilities for greater production, better use of floor space, more uniform drying, and lower drying costs. In addition to drying, some types also have a wide application for sterilizing and roasting purposes. Their adoption for these various uses involve many factors which require intensive study and close cooperation between the dryer manufacturer and the food processor to insure a successful installation.

From the standpoint of drying, foods may be classified roughly into two groups. In the first group are fruits and vegetables, which are dried to impart keeping qualities. These foods usually sell at such low prices that the adoption of any but the most simple drying methods is not commercially profitable. Consequently they do not, at present, offer a logical application for the production type of dryer except, possibly, for institutions and the government.

Institutions, such as hospitals, may prefer dessicated to preserved foods and thereby justify the use of a more elaborate drying system. Prisons or relief institutions may have sufficiently cheap sources of food and labor that they, too, can employ the greater productive capacities of these air dryers. In the case of the government, some factor, such as a war, may encourage the dessication of foods to insure better keeping qualities, to give lighter shipping weight, or to obtain lesser bulk.

The second group includes breakfast foods, dessert powders, casein, coconut, vegetables for further processing such as peppers which are made into paprika after being dried, and most all other manufactured foods. This group lends itself to this type of drying because manufacturing costs bear a higher ratio to the selling price than do those of the first group and because savings in time and production costs are desirable. An even more important consideration is the desirability of uniformity in the dried product. The dryers which are discussed in this article have their widest application in this group.

Principal factors to be considered in working out details of a drying installation are, (1) the form of the product, (2) moisture content before and after drying, (3) effect of temperature on the product, and (4) production requirements.

Non-rotary air dryers pass heated air across the product as in tray or shelf-type dryers, through the product as in continuous conveyor type dryers. In these dryers the rate of drying is faster than with the older methods of room drying; particularly when air is passed through the product, which is the usual procedure in food drying. To this end food products are usually ground, flaked, shredded or otherwise simplified in form.

Moisture content before and after drying is especially important. Moisture loss represents the drying load. Removal of as much moisture as possible with a roll or other mechanical dryer before sending a product to the air dryer is advisable, in order to lower cost and save time, but is not always practical. Sugar and casein are two products which can be mechanically treated before air drying.

Drying temperatures selected must be suited to the ability of the product to withstand heat. Nuts and breakfast foods can be dried at 200 to 300 deg. F. Dessert powders must be held

A UNIT OPERATION OF FOOD ENGINEERING

Drying

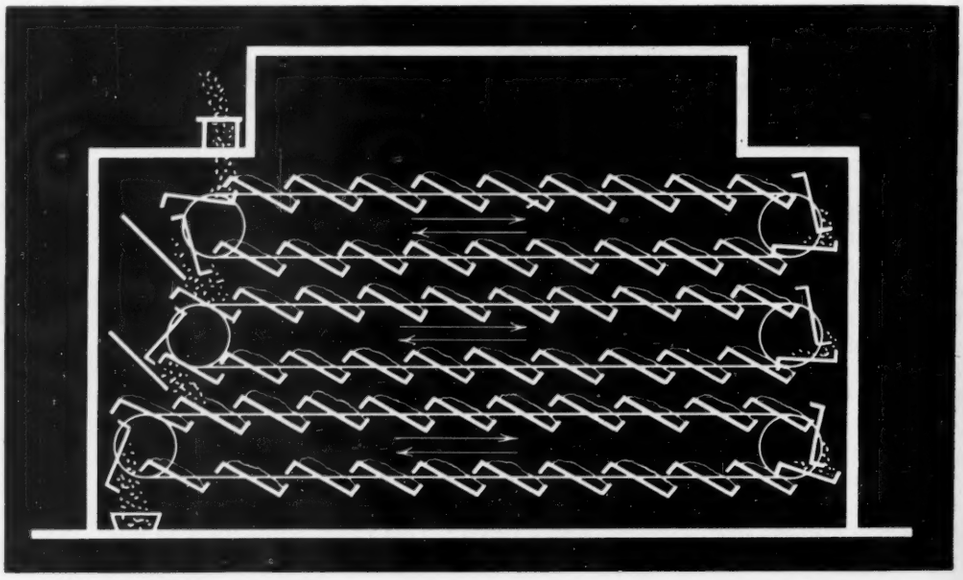
▸ Air drying with mechanically-operated cabinet, conveyor, truck or tray dryers may be carried out in a batch or continuous manner, at atmospheric, or less than atmospheric pressures, and between flexible or rigidly controlled temperature limits. Physical and chemical properties of the materials to be dried, as well as their market value before and after drying, play an important part in the selection of the type of drying equipment for this service.—Editor.

below 120 deg. F. to protect the granule coating. Other foods, such as red beets, case-harden at high drying temperatures and must be held at lower points for four to five hours. Spinach can be dried at a relatively high temperature in approximately twenty minutes.

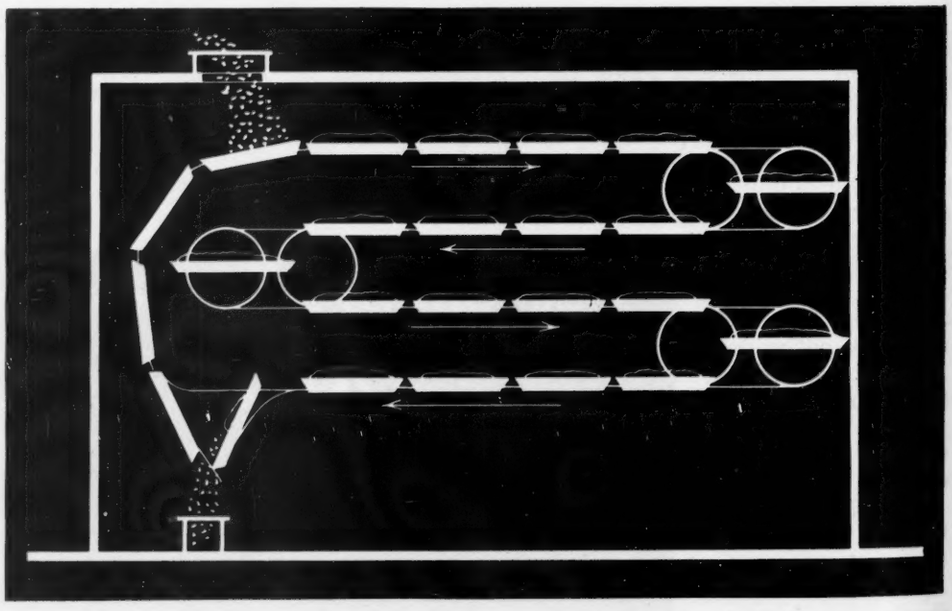
Rate of moisture removal and temperature limitations directly affect drying time and production; the longer the drying time the larger must be the dryer to turn out a given production. Large volume production usually means a continuous-type dryer, although a group of batch dryers may be sufficient. Floor space, power and steam facilities, and investment must also be considered.

Packaging and shipment usually follow the drying operation fairly closely. The final and most important consideration, therefore, is the control of the dried product to assure a satisfactory and uniform quality. Variation in moisture content may result in spoilage; may change the flavor; or possibly cause the product to pack, gum or be too dry in the package. For these reasons drying must be a controlled process and must give uniform results.

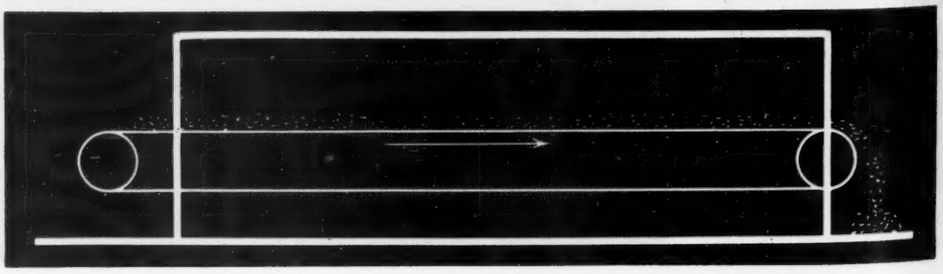
With these requirements in mind, the first move in solving a drying problem is to establish standards; the second is to select the system. Ex-



Reversing pan type of continuous dryer. Pans or trays are supported at sides by carrying chains running continuously around sprockets at ends of dryer enclosure. Two or more of these conveyors, one above another, may be used. Pans are set at an angle, permitting circulation of air downward, over material. For use with loose or granular material that will spread itself fairly evenly over pan.



Non-reversing or non-tilting pan type of continuous dryer. Pans or trays are supported on chains at the sides in such manner that they travel in descending levels around sprockets, back and forth through the dryer enclosure, making a final return loop from bottom level to top, after discharge of material. For use with semi-liquid, lump and granular material.



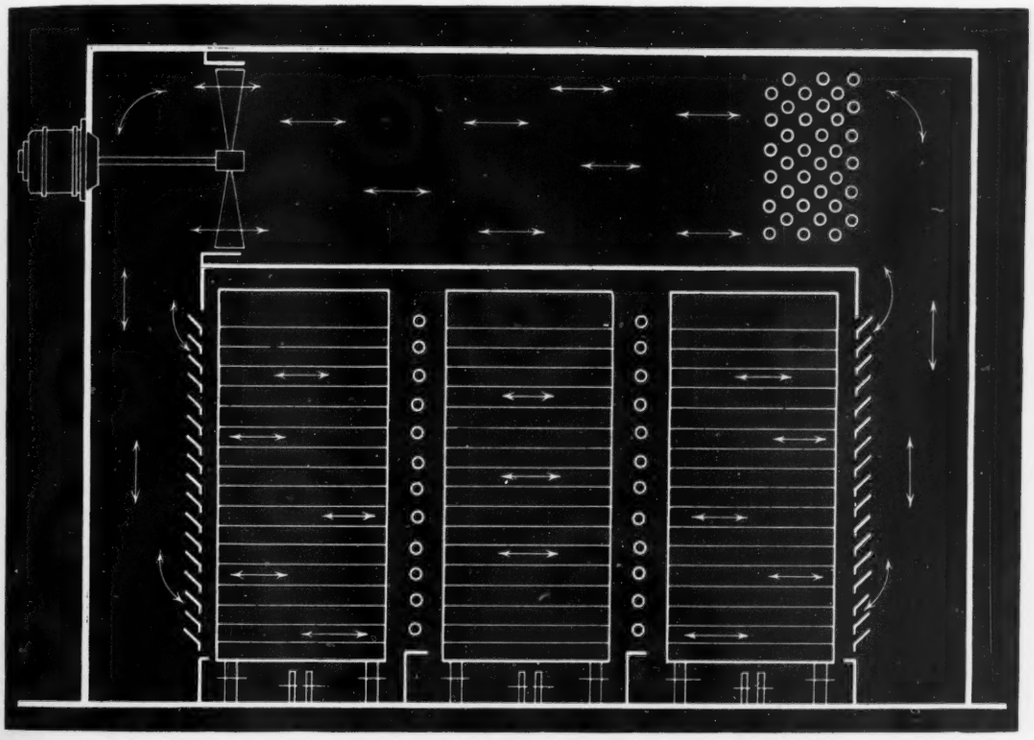
Single conveyor type of continuous dryer. Using a mesh or wire-screen belt, this type of dryer loads and unloads outside the dryer enclosure. Multiple-conveyor dryers of generally similar type are also made. Air circulates downward, through the material and the belt. By varying the mesh of the belt, dryers of this design will accommodate a wide range of materials.

tensive experimental work may be required to determine the best drying procedure and, in some cases, a change in form of the product may be necessary by shredding, granulating or otherwise making it easier to dry. In this respect close cooperation between the processor and the dryer manufacturer counts. A mutual appreciation and understanding of the problems of each are needed.

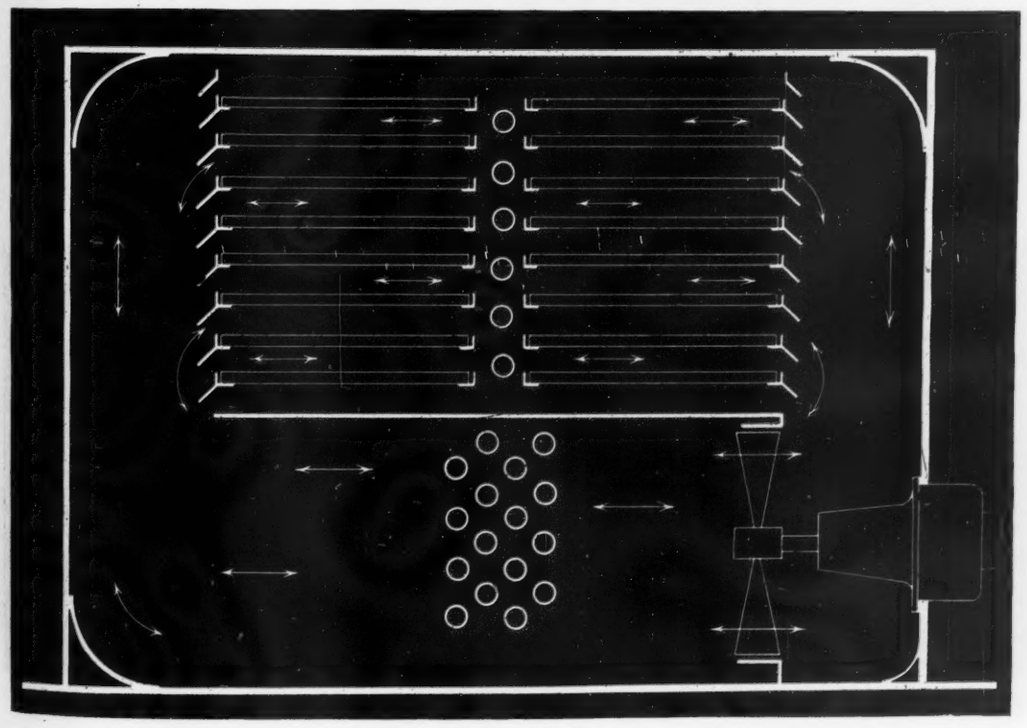
When the drying conditions and production requirements are determined selection of the drying equipment follows. The several types of non-rotary air dryers may be classified as either batch or continuous depending on whether production follows one description or the other.

Batch dryers are of the truck and tray types and include an insulated cabinet usually with some form of air circulation. Trays or pans of the product to be dried rest on racks in the cabinet itself or on trucks which are movable for loading and unloading. Batch dryers offer the advantage of low investment and are completely adequate for many jobs. They are widely used for such products as shelled nuts, grated cheese and dessert powders.

The second class of these dryers is the continuous type. These are essentially production machines permitting a wide latitude in drying



Truck type of batch dryer. For drying materials in batches, where it is convenient to place the material on trays or pallets carried on rack body trucks, dryers of this type are widely used for food products. This design can also be adapted to continuous drying by having the racks suspended from a chain conveyor which passes through the dryer enclosure.



Cabinet tray type of batch dryer. Trays loaded with the material to be dried are inserted in the cabinet by hand. This design is suited to relatively small quantities of material, or to laboratory service.

conditions and insuring a control of drying conditions and a uniformity of the final product possible with no other dryer. Also they can be built in units to meet any production requirements. In construction they consist principally of an insulated compartment with positively controlled circulation of heated air and equipped with a moving conveyor on which the product is carried through the dryer. Drying conditions may be graduated or changed at will in any section by the use of automatic control devices.

These dryers are used on a wide variety of products, including breakfast cereals, casein, grated cheese and dessert powders. Their adaptability is shown in the experience of a large Eastern food manufacturer who is drying shredded coconut, a high fat food. The nature of this product requires that a number of important drying factors be controlled in close limits and that the finished product be uniform to a high degree.

Moist, sweetened coconut before it is ready for drying consists of a mixture of shredded coconut, sugar, glycerine, salt, and water. Excess moisture must be removed to prevent the sweetened product from becoming rancid and moldy in a short while. Excess moisture will also cause the coconut to stick and to pack in the containers; results highly undesirable from a merchandising viewpoint.

Coconut ready for drying at this plant contains approximately 21 per cent moisture (wet weight basis). Ready for packing it averages 6 per cent moisture (commercial dry weight basis).

The mixture comes to the dryer from a mixing kettle on the floor above by dropping through a chute onto the wire mesh conveyor belt of the dryer. An operator roughly distributes the sticky mass manually. An automatic spreading device then spreads it to a uniform depth. As the dried coconut comes out at the delivery end of the dryer it is ready for classifying on a shaker screen and packing. In passing through the dryer the coconut is subjected to three stages of drying temperatures. In the first two sections of the dryer it is subjected to two different drying temperatures which are automatically controlled within 1 deg. F. In the third and last section it is cooled ready for packing as it comes out.

The dryer used is of the automatic type with a continuously moving wire-mesh belt conveyor designed and built by Proctor & Schwartz, Inc., Philadelphia, Pa.

Production rate varies; however, a nine-hour run is typical. In this period production averages 8,550 lb. (dried weight); has a rate of 950 lb. per hour. Steam consumption averages 324 lb. per hour at 82 lb. pressure or 1.80 lb. steam per lb. of water removed. This consumption is equivalent to 0.341 lb. of steam per lb. of dried coconut. Power consumption averages 12 kw. per hour or 0.0126 kw.-hr. per lb. of coconut.

In Table I labor includes operating, cleaning and maintenance time at an average cost of $0.40 per hour. Steam is figured at $1.00 per M lb. and power at $0.05 per kw.-hr.

Table I: Cost of Drying 1,000 lb. Coconut (Case Study)

Fixed charges—including depreciation, at 10 per cent, interest, floor rental and upkeep.	$0.619
Steam	0.341
Power	0.631
Labor	0.994
Total	$2.585

These high production figures and low drying costs have been obtained with complete satisfaction as to the quality of coconut. In spite of the varying nature of each day's run it is possible to turn out a uniformly dried product which keeps well and is entirely free from stickiness or caking.

Table II shows some other products now being dried with non-rotary air dryers, together with the drying conditions. The list is representative, but by no means complete.

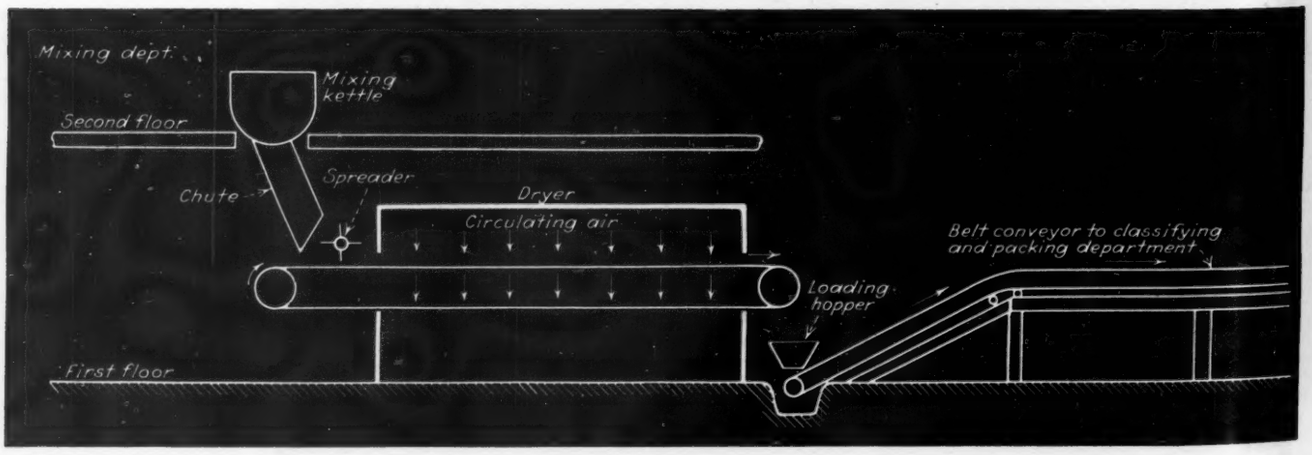
Table II: Representative Foods for Air Drying and Conditions to Be Met

Product	Moisture Before Drying: Wet Weight Basis, Per Cent	Moisture After Drying: Commercial Dry Basis, Per Cent	Drying Time, Minutes	Drying Temperature, Deg. F.
Casein	50 to 60	6 to 10	17–38	130–200
Dessert Powder*	3 to 4	0	90–300	110
Breakfast Cereal	27	1	240	240
Peppers	78	5	12–26	190
Grated Cheese	35	18	70	110
Coconut	21 to 27	6	40	100–140

*Time is different for each flavor.

Use of continuous dryers throughout manufacturing industries is extensive. Wide use of them in food processing is anticipated as their possibilities are better known. A general cost comparison between them and batch dryers is not possible, but in general the continuous dryers will give more uniform production, better temperature control, usually a lower operating cost and a more uniform quality product than will batch dryers. Application of dryers and the results obtained are matters for careful collaboration between processors and dryer manufacturers.

Sketches of dryer types accompanying this article were made available through the courtesy of Proctor & Schwartz, Inc., Philadelphia, Pa.



Diagrammatic sketch showing flow of shredded coconut, a high fat food, through continuous dryer to packaging department.

New Carton Promises Savings

This container and the Ancira cartoning machine which makes it are an outstanding development in the art of packaging.

By FRANCIS CHILSON
Consulting Production Engineer,
New York, N. Y.

UNDER ordinary circumstances we do not expect more of new cartoning equipment than it shall save money on labor. But when a new cartoning machine also saves packaging materials, that is news. It is because of this that the Ancira cartoning machine constitutes one of the most interesting developments in the history of packaging.

This carton and cartoning machine (they cannot be considered apart as one is inseparable from the other) offer such promising economies to food manufacturers that the devolpment of this new idea will be watched with interest. The carton saves material because the wedge construction of the flaps makes it possible to dovetail the flaps in such a way that very little material is wasted in die-cutting the blanks.

If reference is made to the Swift's Silverleaf Lard blank, shown in the

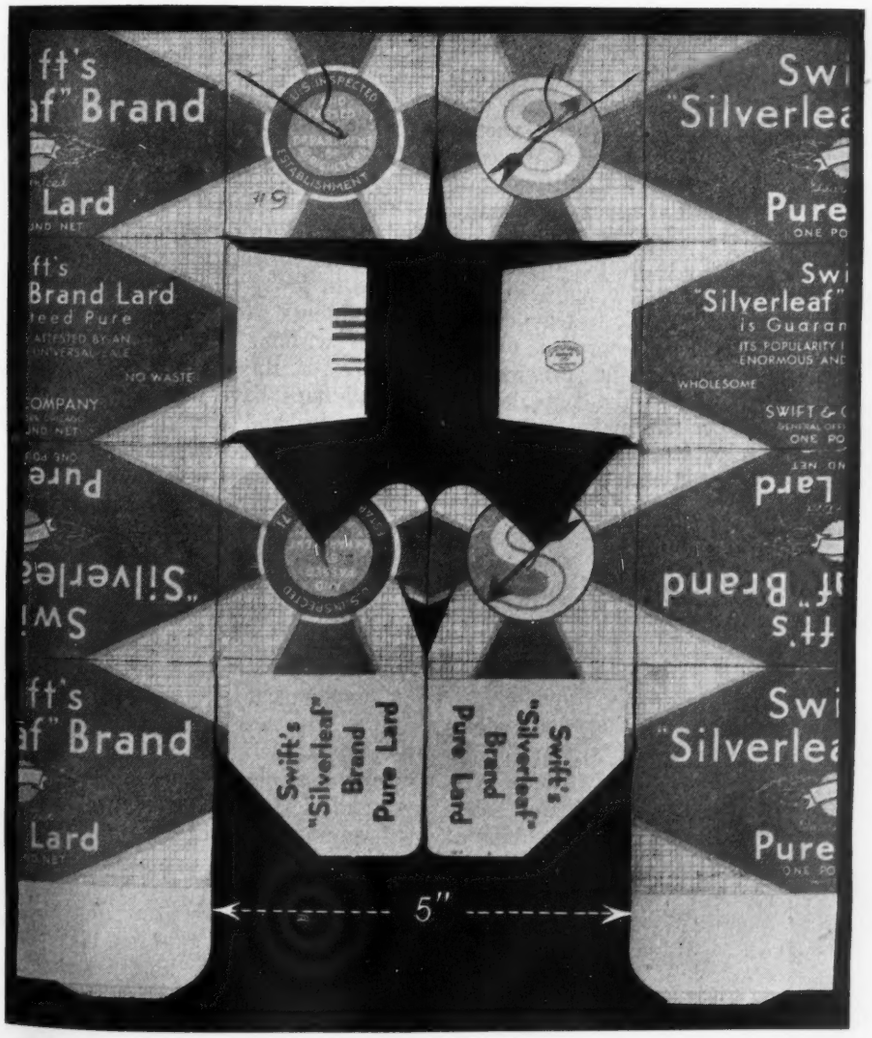


Fig. 1: Blank layout for conventional 1-lb. lard cartons. It takes a 5-in. width of stock to provide for the flaps in this carton, contrasted to an Ancira carton of same size, which takes only a 2-in. width and enables a saving of over 29 per cent of the material.

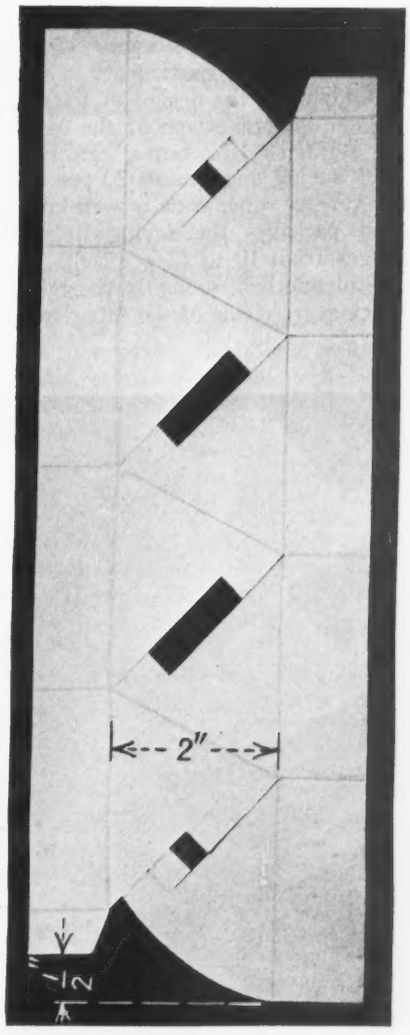


Fig. 2: Blank layout for 1-lb. Ancira lard cartons. Note the fact that only a 2-in. width is required for the flaps.

accompanying illustration, it will be seen from the manner in which the blank must be laid out on the sheet, that 5 in. of stock is required for the flaps alone. The amount of stock wasted in the die-cutting operation is apparent from an inspection of the layout (See Fig. 1).

Comparing this with the layout for the Ancira blank (Fig. 2), it will be observed that the Ancira blank requires only 2 in. for the flap layout, the capacity of the cartons being identical. It will be noticed further that practically none of the paper stock is wasted in die-cutting. This is emphasized by Fig. 3, which shows the flaps pulled apart slightly.

In this particular instance the saving on stock alone amounts to slightly more than 29 per cent. To put it still more graphically 1,419 Ancira blanks can be made with the same amount of stock required to make 1,000 regular blanks. What this means to a manufacturer who must package cheaply is at once apparent.

THE amount of stock which can be saved in particular instances depends upon the design of the flaps and the general shape of the carton. On Borden's 1-lb. butter carton the stock saving amounts to 20 per cent. On various other equally well-known food packages the saving in stock ranges from 10 to 33 per cent.

Still another saving is possible in all cases by virtue of the fact that the construction of the Ancira carton makes possible the use of lighter carton stock, while at the same time providing a package of even greater rigidity. When the complete Ancira blank (Fig. 4) is made up it is much more rigid than the corresponding Swift blank of the same size. This is due to the fact that the wedge-shaped flaps of the Ancira carton are interlocked—a better word is interwedged—so that every part of the end takes part of the pressure applied to any one point.

Still another feature of this carton, which will be of interest to designers, is that it can be made up in several shapes, including triangles (Fig. 5), hexagons, oblongs and squares. And what is more important to production men, all these shapes can be handled automatically on the Ancira cartoning machine. As a matter of fact the triangular shape can be assembled as easily as the oblong.

In order to provide for the varying requirements of the food trades, the Ancira carton may be made in several ways:—with transparent windows, with a reseal feature for products that are not consumed at one meal. The ordinary Ancira carton must be destroyed to get at the contents. This provides a pilfer-proof feature that will appeal to many manufacturers. In cases where resealing is required, a perforation is provided around three sides at one end to make it possible to tear off the end. A score-line on the fourth side provides a hinge, and a concealed inner flap makes it possible to close the package in good shape after it has been opened. Even this form provides a tamper-proof feature because a broken perforation line will indicate that the package has been opened.

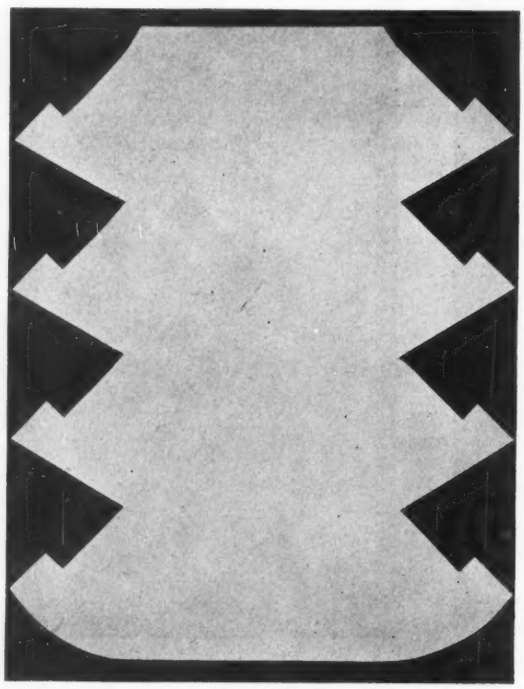


Fig. 4: Completed Ancira blank.

A side flap, as shown in Fig. 4, is provided for cartons that open along the sides. Even though in this case the seam is open it is still impossible to remove the contents of the carton without destroying the package. A well-known brand of whiskey is packaged in an open-front carton with tin ends, one of which is crimped on after the bottle is put into it. This type of tamper proof feature offers an interesting contrast to the Ancira type. By the judicious use of a razor blade the tin end of the whiskey carton can be removed, the bottle withdrawn, and the cap replaced. Such a thing is impossible with the Ancira carton. A skeptical gentleman lost a sizeable bet trying to prove that he could remove the contents from a similar Ancira carton without destroying it. The reason for this is that the wedge-shaped flaps have little cuts at their extremities and scored ears. When the carton is assembled these ears interlock in such a way that the flaps cannot be pulled apart without tearing them. A glance at Fig. 6 (showing a carton cut in half) reveals how these ears interlock on the inside of the carton. To make assurance doubly sure, the machine used to assemble these cartons is provided with an ingenious device to bend the last of the flap-ears back while inserting the flap in such a way that it is by no means possible to open the package without destroying it. This locking ear cannot move because the contents of the carton hold it in place.

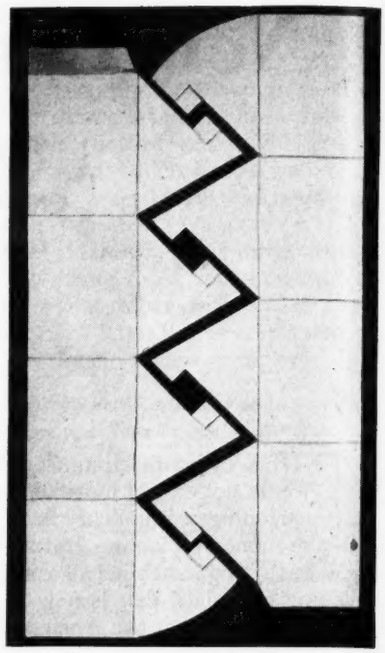


Fig. 3: Flaps of Ancira blanks slightly pulled apart, to emphasize that almost none of the stock is wasted in die cutting.

UP TO the present we have described the carton as used for products like lard, butter and ice-cream, requiring a side opening. Gelatin dessert, dry food products, cereals and the like requiring a tight-sealed package can utilize the same type of carton, but in such cases the

open seam is cemented automatically in the machine.

In discussing the machine it is necessary to mention that as the Ancira carton cannot be opened by hand or otherwise, neither can it be assembled by hand. Those who use this patented carton must use the machines that have been developed to assemble it. This does not preclude the use of the carton for small run goods or by the small manufacturer, because a semi-automatic machine has been developed for such applications.

IN ADDITION to the semi-automatic machine, there are two other units, both automatic—one is called the simplex and the other the duplex. The simplex is said to be capable of a speed of 160 cartons per minute on butter, and, theoretically, the duplex should be capable of twice that. But we have had too much experience with packaging at high speeds to believe any such speed claims until we have seen them happening. However, we ourselves ran the model of the simplex machine at a speed rate of equivalent to 50 per minute, and this output for a more or less crude model operated with a hand crank is not to be passed over lightly. We believe the theoretical speed of the simplex to be perfectly reasonable, but when packaging speeds exceed this rate, things have a habit of happening to the merchandise which is to be cartoned that cause jams and force the shutting down of equipment, even though the equipment itself is not at fault.

Ordinary cartoning equipment operates on the principle of loading a carton which is set up and sealed by the machine. The Ancira cartoner wraps the carton around the merchandise with a rolling, forward motion, at the same time interlocking the ends. Merchandise is fed from preceding package machinery on belts. An ingenious spacing arrangement lines up the merchandise and places it in such a position that it will enter the feeding magazine readily.

The blanks are placed in magazines as they are on any ordinary cartoner. As the machine operates a blank is drawn from the bottom of the magazine and carried forward under the loading station. As it travels forward the flaps are folded upward and the carton blank is in this position under the loading magazine when the merchandise is dropped onto it.

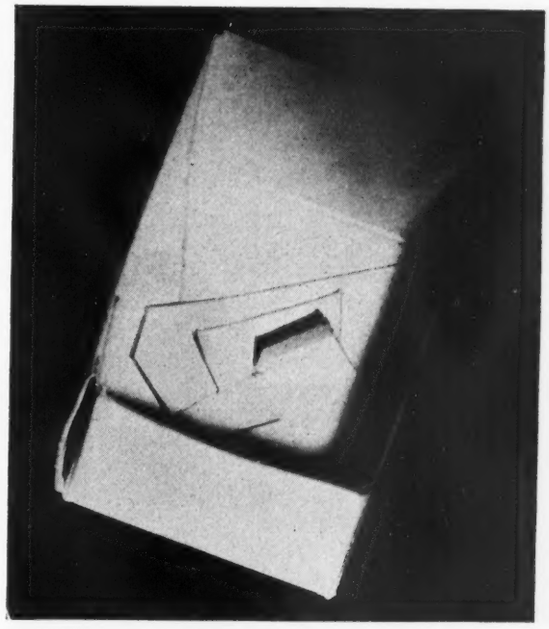


Fig. 6: Interior of Ancira carton, showing how ears on flaps interlock.

It is difficult to describe with sufficient clarity the involved mechanism which closes and ejects the finished package. Yet it is simple enough and may be compared with the motion of the human hands in rolling a cylindrical object in wrapping paper. The blank is rolled around the contents with a straightforward rotary movement. This procedure is followed in handling solid merchandise. Free-flowing materials like coffee are weighed in the required units and deposited in the set-up and partly closed blank.

AS STATED previously, all motions are forward and rotary in character and the entire mechanism is driven from a single cam-shaft. The duplex machine is similar in principle to the simplex, but the magazines are in double instead of single units. In operating the hand machine the operator lays the merchandise on the blank and pushes both into the closing mechanism, which completes and ejects the finished package.

It is the writer's opinion that this is one of the most promising and interesting developments in the history of mechanical packaging. But we do not believe that the manifold types of merchandise the machine will be required to handle in the future can be handled in the simple manner that an inspection of the machine and its carton would lead us to believe. There will be a number of knotty little problems to work out, but we are optimistic enough to believe that, for many solid food products, these difficulties will not prove insuperable. In any case the food industries will follow this development with interest.

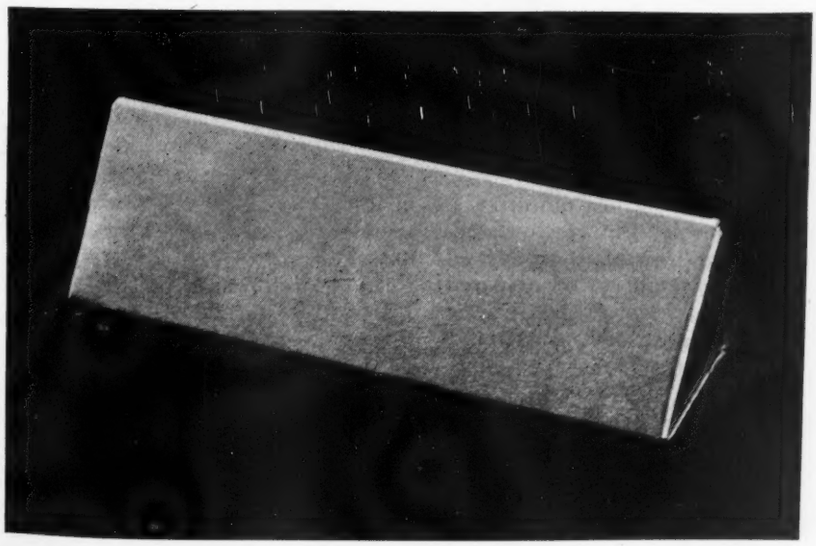
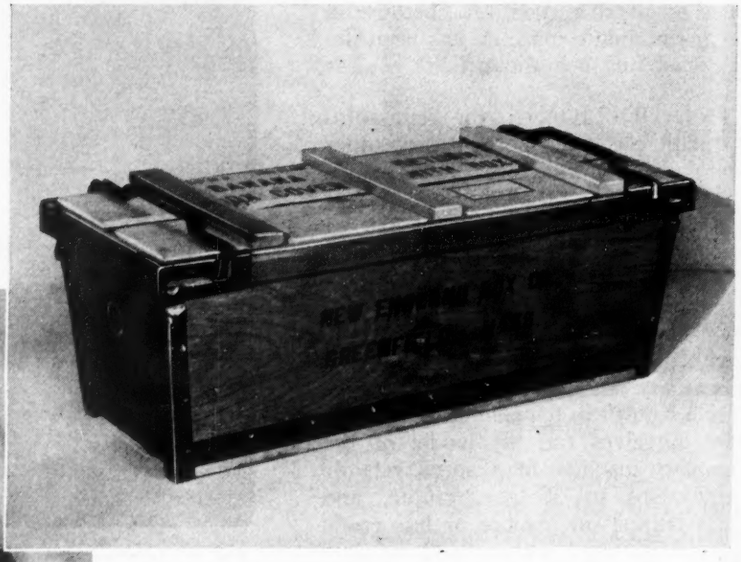


Fig. 5: The Ancira carton can be made up in triangular, hexagonal and other shapes and handled automatically on the Ancira cartoning machine.

Food Packages and



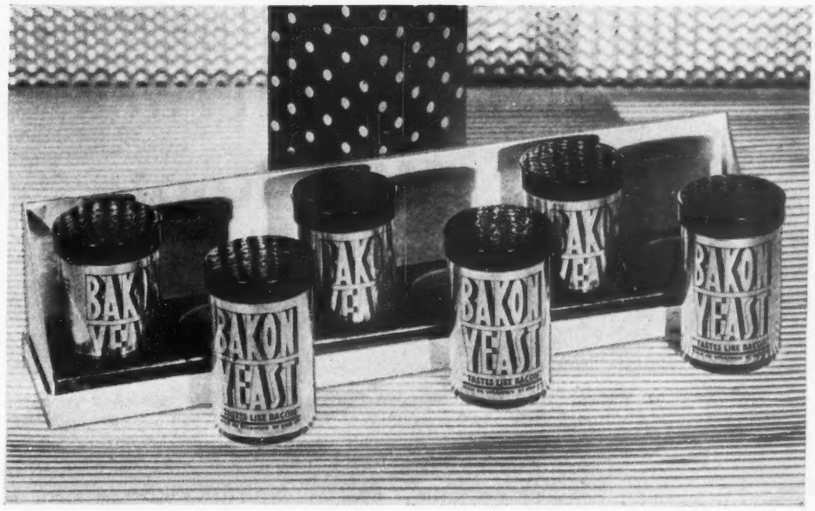
Packages Win Honors. One first place and six honorable mentions were accorded food packages in the Wolf Award competition sponsored by American Management Association. The first went to the "Jiffy" Banana Pac used by Meloripe Fruit Co. and designed by Jiffy Pad & Excelsior, Inc., this being judged the most effective shipping container from the standpoint of merchandising and construction ingenuity. It comprises a shipping box made by New England Box Co. and lined with a Jiffy pad, both the box and the pad being reused many times. Whole stalks of bananas ride in the container, cushioned and insulated by the pad. To close this container, it is merely necessary to put the top in place and pull the two handles in position over it.

John Morrell & Co.'s can for Prido shortening won honorable mention for effective use of typography and lettering, and again for effective use of the elements of design to create shelf visibility. Two R. H. Macy & Co. packages received mention, the Mocha and Java can for effective use of typography and lettering, and the Red Star Coffee can for effective redesign. The other two honorable mentions for food containers went to Rumford Co. Its baking powder can received distinction as an effectively redesigned package; its containers for prepared flour, cooking chocolate and baking powder were mentioned as an effective family of packages.

Whole-Fruit Citrus Base. Whole citrus fruit—peel, pulp and all—now is being shredded to prepare a base for milk and water beverages. The fruit is fed a case at a time into a special converter where high-speed knives reduce it to a mulch. It passes in this form through a device which removes the fibrous material and permits the fluids to pass into water to form the base.

One part of the base is added to five or six parts of skim milk to produce a beverage which is said to be more readily digested than unmodified skim milk and to contain 705 units of vitamin C per quart. A beverage of this type is being marketed by Golden State Co., Ltd., large Los Angeles dairy. The base also is used in ice cream, sherbets and similar products where synthetic, concen-

Products



trated, canned or heat-treated citrus flavoring customarily is employed. Added to water, it goes on the market as "Freshway" orange and lemon beverages.

Lemon base prepared by this process is the first lemon product to be added to milk without danger of curdling, according to Paul Hawkins Co., Los Angeles, licensors of the method.

Following success in California, Freshway beverages have been introduced in Indianapolis.

Unwind As You Eat. A non-smear-ice cream confection in stick form recently was tried out on the door-to-door routes of Good Humor wagons in the Los Angeles area. The product is packaged in a "Twistee Cup," which is a spirally wound paper container with a thin outer wrap and a stiff inner tape which tears the outer covering along the spiral. The consumer unwinds the container to get at the food. Nor is that the only convenience. The cup has a countersunk bottom to provide space which will accommodate a paper napkin.

A development of Paul Hawkins Co., Los Angeles, the spiral package measures $6\frac{3}{8}$ in. overall, with a product compartment length of $4\frac{1}{2}$ in. It is 1.338 in. in diameter and contains $3\frac{1}{2}$ fluid ounces. The machine for filling it handles 21,000 during an eight-hour day.

Vitamin D Candy. Neither cod liver oil nor halibut liver oil supplies the vitamin extract for a new health candy put on the market by Gorton-Pew Fisheries Co., Ltd., Gloucester, Mass. The company uses instead an extract of biologically-tested medicinal swordfish liver oil, this oil having 150 times the potency of cod liver oil in both vitamin A and D.

Made in the form of golden-colored lemon drops, the candy in one package is equivalent in vitamin content to two teaspoons of standard U. S. P. cod liver oil.

The confection is packaged in a waxed paper bag enclosed in a cardboard carton which opens at the end. The design, in yellow, blue and red, conveys the "sun drop" idea.

Yeast With Bacon Taste. Yeast which is 100 per cent pure and yet has a flavor resembling that of bacon is a development of Bakon-Yeast, Inc., New York, N. Y. It is a form of brewers' yeast, and the flavor comes from smoking over hickory, as in the case of bacon. The idea is to provide this food, which is rich in vitamin B and in iron, in a form which can be eaten in many dishes. It may be used with spreads, fried eggs, soups, sauces, gravies, salad dressings, vegetables, meats and what have you.

A cleverly designed package carries the yeast to the market. It comprises a glass jar with a screw metal cap perforated to form a shaker top, an inside disc of waxed paper covering the holes. When empty, the container can be reused for condiments, and a glued strip of paper-backed foil lettered with "salt," "pepper" and so forth is provided for labeling.

Canned Cherry Juice. Following several years of experimentation and the testing of more than 160 processes, Reynolds Preserving Co., Sturgeon Bay, Wis., now is producing "Cherefresh," a natural cherry drink in enamel-lined tin cans. Good quality, orchard-run cherries are used, the warm fruit from the orchard being promptly placed in storage tanks of cold water to stop possible fermentation and to wash and firm the product. The juice is then extracted cold, since preheating before pressing imparts a cooked flavor; hydraulic presses are employed in one step of the extraction operation. The crude juice must be handled in non-corrosive pipes and containers throughout the process, and during the heat stages steps must be taken to prevent oxidation. Near the end of the process filter aids are used to clarify the juice, and as the final step cane sugar is added. Canning is done under vacuum, one can containing one pint three ounces and retailing at 18 to 20 cents.

Smaller Trucks to Cut Milk Route Costs

Small four-cylinder engine is used in a new half-ton model for fuel saving

SPEAKING of reducing the cost of the retail delivery of milk, FOOD INDUSTRIES stated, on page 21 of its January, 1933, number that: "Transportation engineers outside the milk industry, who have studied the use of motor trucks for retail deliveries in zones in which it is physically possible for horses to be used, point out that the higher cost by trucks is due to the improper application of the trucks. Whenever a truck is substitued for a horse wagon, vehicle for vehicle, with approximately the same work done within the limits of the working day, the unit cost of delivery by motor truck cannot help but be greater than with the horse wagon. This is because the conventional motor truck costs from two to three times as much.

"These same engineers point out that lower motor truck unit costs in horse wagon zones must come by one of two solutions to the problem. These are the development of a motor truck that will cost no more to buy and operate than a horse wagon. As the present day route truck is not in this category, this solution of the problem must await the development and acceptance by the dairy industry of a motor truck which will carry as much as a horse wagon and can be bought and operated at equal expense.

"The other solution is to make the existing conventional straight-frame truck or dropped-frame truck do sufficiently more work in the same time as required by the horse wagon to more than offset the difference in the first cost and operating expense.

"Assuming that the driver of the horse wagon is at present working to the limit of his physical ability, substituting a motor truck for a horse wagon within the wagon zone will not enable him to do more work. Accordingly, it is pointed out, the only way to get more work done by the motor truck is to put on more than one man."

The basic statements made above are just as true today as they were three years ago. However, several changes have occurred in the picture since that time.

SO FAR as the larger dairy companies are concerned, apparently no attempt has been made to solve the problem of reduced retail route costs by the substitution of the two-man milk truck for the horse wagon. Most of the larger dairies are using just as many horse wagons at the beginning of 1936 as they were at the same time in 1933. They seem content to leave the horse just where he has been for the past 50 years, on the short-haul route.

In this connection, however, it must be admitted that the past three years have been strenuous ones in which declining volume in many instances, the NRA and state legislation and labor troubles have resulted in most dairies attempting first to maintain their *status quo*.

It is a fact, nevertheless, that there seems to be no concerted effort by the dairy industry to eliminate the horse on short retail milk routes. On the contrary, the trend toward the mounting of horse wagons on pneumatic tires, as told in articles in FOOD INDUSTRIES for June, July, August and September, 1934, has had the effect of prolonging, rather than curtailing, the life of the horse wagon on the short route.

But in the meantime, the automotive industry has been busy attempting to solve the problem with a truck to cost no more to buy and operate than the horse wagon.

One of the first makes of truck designed to accept that challenge of the horse and wagon was the "Pak-Age-Car," described and illustrated fully with all other makes of trucks sold for retail milk and bread routes in an article in FOOD INDUSTRIES for March, 1933. The "Pak-Age-Car," which has been improved since 1933, is designed especially to compete solely with the single horse wagon, and not with other gasoline or electric trucks.

With all automotive vehicles, the volume of production is a very important factor in the sale price to the consumer. If the volume is small, the price must be relatively high; and if the volume is large, the price will be relatively low.

Hence the manufacturer of a specialized vehicle finds the advantages of the vehicle's special engineering design affected in connection with the first cost to the consumer, unless a sufficiently large production volume can be built up.

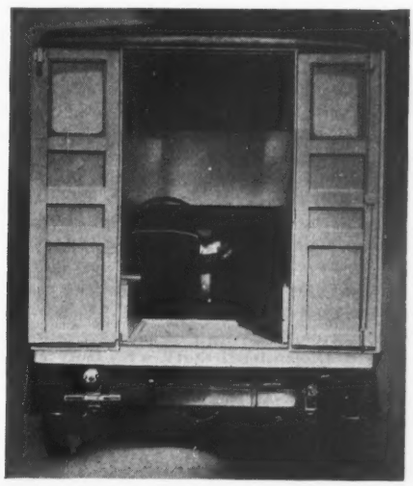
SEVERAL of the conventional truck manufacturers, while manufacturing special models of retail milk trucks designed for the long routes, have attempted to produce a truck equal in first cost and operating cost to the horse wagon, by taking one of their light, large-production models and converting it for use on short routes. One such company is the International Harvester Co., Chicago, Ill.

Although the International company has offered a special truck known as the M-2 since 1933, and only recently brought out an improved model known as the M-3, it was not until 1935 that it developed a small, light vehicle intended to replace the horse wagon. The new model, known as the C-5, is shown herewith.

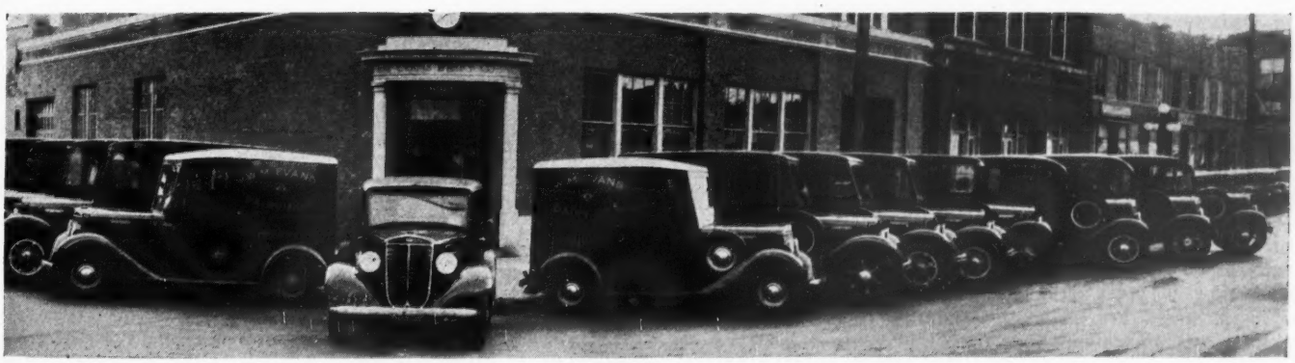
With the exception of the engine, rear axle ratio, special body and other minor differences, the Model C-5 truck is similar to the International six-cylinder Model C-1, half-ton unit.

However, for gasoline economy, the C-5 is furnished with a small four-cylinder engine, 3¼x4 in. with a

At the left are three of the new International half-ton, C-5 milk trucks, fitted with panel bodies, while the remainder of the fleet shown, belonging to the New Dorp Dairy, Stapleton, N. Y. are International M-3 trucks, fitted with retail route bodies.



At the left is one of a score of C-5 International trucks used by the Borden's Farm Products Co., New York City. The body weighs 1,050 lb. A full capacity load of 28 cases weighs 2,100 lb. at 75 lb. per case. This is a 50 per cent overload, which, however, is a diminishing load. Helper springs and oversize tires may be fitted. The tires shown are oversize, 700x15, in place of 600x16. At the right, rear of one of the standard models (not Borden's) without case racks showing interior and two rear doors.



The two trucks at each side of the center truck are new C-5 International half-ton milk trucks operated by W. M. Evans Dairy Co., Brooklyn, New York. Each truck is fitted with a small four-cylinder engine. Tests made on the above trucks and others operated in the New York Metropolitan area, showed miles per gallon of gasoline consumptions respectively of 6.17; 9.96 and 12.23 on routes of 10, 25 and 40 miles in length.

total piston displacement of 133 cu.in. The compression ratio is 6 to 1. The A.M.A. rating of the engine is 16.9 hp., although it develops 33 brake horsepower at 2,600 r.p.m.

In this connection, it is important to note that, while most general purpose trucks are being furnished with six and even eight-cylinder engines for greater acceleration and road speed, these attributes are neither necessary or desirable, especially when competing with the horse on short routes.

BRIEFLY, the Model C-5 is a half-ton truck listed at $895, complete with body and racks, and capable of carrying 24 to 28 cases of milk. It comes in two wheelbases, 113 in. and 125 in., the former weighing 2,100 lb. and the latter 2,145 lb. The rated carrying capacity is given at 2,100 lb., including the body.

Figuring a case of iced milk at 75 lb., the weight of 28 cases is 2,100 lb. This, with the body weight of 1,050 lb. gives a total of 3,150 lb. This is 1,050 lb., of 50 per cent, overload. Because the load is a diminishing one, some users justify it by fitting auxiliary springs, and 700x15 instead of 600x16 tires.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

Factors to Consider In Selecting Trailers

Question No. 16

1. What principal factors lead to the choice of trailers (either semi or four-wheeled types) in preference to trucks with two or three axles?

2. What do you consider the minimum load (in tons or cubic feet of volume) at which semi-trailers become preferable to conventional trucks?

3. What factors of operation, other than minimum load, limit the use of semi-trailers for retail food delivery?

4. What effects have road grade and road surfaces upon trailer selection?

5. When does a four-wheel trailer, pulled behind a conventional truck with body and load, become preferable to a tractor semi-trailer hauling the same total payload?

Semi-Trailers Preferred

WE SUBMIT the following answers to your questions:

1. We believe better operation can be had with the semi-trailer because of these facts: Two tractor units can be used with several semi-trailers, making the investment much smaller. Semi-trailers show an advantage in case of mechanical failure on the road. An extra tractor can immediately be dispatched to replace the one that has broken down. With this method, the load does not have to be changed. This is an important factor where fragile or perishable goods are carried. Also, a larger load capacity can be had with semi-trailers because of legislation permitting a larger overall length. Maintenance costs on trailers are very slight in comparison with a conventional type of truck. The ease of maneuvering a semi-trailer in traffic and at the garage and plant is another advantage over a four-wheel truck.

2. In our business, weight is not an important factor. It is a matter of bulk which necessitates a large cubic capacity of the body. We find that a minimum capacity of 700 cu.ft. can be used advantageously, while some of our larger units have as much as 2,000 cu.ft. of capacity. As a weight factor, 5 tons is about the minimum weight of semi-trailer operation.

3. None in our operation, except that, in inter-city and inter-state hauling, different states and cities have a large variance in overall-length and weight laws. One state will allow 60 ft. overall-length while another limits it to 40 ft. Semi-trailer operation is favorable if the overall-length is not too short. In certain sections of New York City, large semi-trailers cannot be used due to an ordinance prohibiting trucks with an overall-length of more than 35 ft. A four-wheel unit or small semi-trailer must be operated in this case.

4. Tractor and semi-trailer operation is most favorable on concrete or asphalt highways due to less wear and tear than if operated on macadam or gravel roads. We believe the question of grades has only a small bearing on modern highways in deciding whether a semi-trailer or conventional type of truck should be used. While in the past the four-wheel truck showed to a decided advantage on steep grades, truck manufacturers have improved tractor performance in selecting proper gear ratios, tire sizes and engine performance so that there is practically no difference in grade operation.

5. Four-wheel trailers can be used advantageously if the unit can be loaded and left at one point while the chauffeur continues with the conventional truck or semi-trailer to another destination. Meanwhile, the four-wheel trailer can be in the process of loading or unloading and can be ready for the chauffeur on his return. Using a four-wheel trailer will save time and hauling cost only if it can be used in this manner.—E. JOHN DUGAN, *General Manager of Transportation, Dugan Brothers, Inc., Brooklyn, N. Y.*

Hauls Big Load at Low Cost

WE shall try to answer your questions covering trailers and semi-trailers:

1. A semi-trailer operation compared to a straight truck means that double tonnage may be handled at only a slight extra cost. We have had no experience with trucks with more than two axles.

2. We consider 8 tons necessary before a semi-trailer is preferable to a conventional truck.

3. Semi-trailers are difficult to handle where deliveries are being made in cities, or even country towns, direct to retailers. They take up more room and are more difficult to move through alleys.

4. Semi-trailers may be handled on hilly and unpaved country roads easier than four-wheel trailers.

5. In most cases, four-wheel trailers behind straight trucks are not acceptable, but there might be a few cases where a diminishing load and a return empty over the same route would allow a four-wheel trailer to be left behind and picked up on the return.—*Transportation Manager of a large packing company in the Midwest (name withheld by request).*

State Laws Affect Choice

IN answer to the questions on semi-trailers:

1. (a) Load: In Pennsylvania, maximum load on two axles is 26,000 lb.; three axles, 36,000 lb.; semi-trailer, 39,000 lb.; truck and trailer, 52,000 lb.

(b) Length: Body length of truck is limited to 33 ft. overall (two or three axles). Semi-trailer limit is 70 ft.; full trailer and truck limit, 70 ft. (It is advantageous for bulky loads to use a semi-trailer or full trailer.)

2. Ten tons, or 1,000 cu.ft. of volume, is maximum for a two- or three-axle truck. Loaded body length of 20 ft. is also maximum for trucks with two or three axles.

3. None, that I know of, limit the use of a semi-trailer except minimum load. The full trailer is best for "shuttle" delivery to two points.

4. Trailers operate best on hard-surfaced roads with less than 6-per cent grades.

5. (a) When the total load is over 39,000 lb., it is necessary in Pennsylvania.

(b) When there are two delivery points, the trailer can be left at first while the truck continues to the second.

I have also been talking with a local man who uses a number of trailers and have the following additional information:

1. Bulk is an important factor in the choice of semi- or four-wheel trailers.

2. 3½ tons.

3. Not practical for retail routes (see answer 2).

4. Practically no effect if proper selection of equipment is exercised.

5. Not at any time in the case of payload only. Exception should be made, however, in cases where a four-wheel trailer could be dropped at any point to unload or load while the truck continues on to another point.

P.S.—Different states have different laws governing overall length of conventional trucks and of semi- and four-wheel trailers. Different states also have special rates on two- and three-axle trucks. In the purchase of any new equipment, it is always well first to check the specifications with the State highway department. Get these approved in case there are any laws pending which might outlaw the equipment or increase license fees to be paid.—L. J. SCHUMAKER, *President, American Cone & Pretzel Co., Philadelphia, Pa.*

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Problems of Operating Semi-Trailers

Question No. 17

1. Are semi-trailers as safe to operate as conventional trucks?

2. In semi-trailer operation, what parts of the vehicle have required the most servicing?

3. What is the value of streamlining semi-trailer bodies, and how far should streamlining be carried?

Trailer Is Safer

REFERRING to your questions concerning semi-trailer operation:

1. It is our opinion that semi-units are safer for operation over the public highways than conventional trucks, particularly by reason of greater wheel base permitting better distribution of the load, which otherwise tends to cause a top-heavy state. The springing of the load over the back end of the tractor and the back end of the trailer, with a suspension between of rigid construction, reduces the tendency to turn over or skid. We also observe that the brake performance of semi-units is substantially 33⅓ per cent better than that of conventional trucks.

2. Assuming the question applies only to the semi-trailer, there are relatively few repairs necessary. Wearing parts such as bearings and brake linings must be replaced, but under normal circumstances the proper bearings will operate about 200,000 miles and brake linings 50,000 miles before replacement is required.

3. The reduction of air resistance brought about by streamlining reduces the pull and increases the speed. A reduction in operating cost follows.

Streamlining, to a certain extent, levels power pressure and drag, resulting in increased miles per gallon. It may also, if by reason of novelty alone, be pleasing to the eye.

Since the particular purpose of streamlining is to increase efficiency without affecting revenue, it is our conclusion that streamlining should be limited to such ends.—B. M. ANGELL, *General Traffic Manager, Stokely Brothers & Co., Indianapolis, Ind.*

Streamlining for Appearance

ANSWERING your questions regarding the use of semi-trailers:

In the use of a regular trailer there is a certain danger, of course, on account of the additional weight and the difficulty of getting adequate braking on the trailer. However, the semi-trailers, which are usually operated with what is called a "tractor," should not be any more dangerous than the conventional trucks.

At present time, in a number of states, they have legislation either in effect or under consideration, to limit the length of truck equipment. This makes it very difficult to operate even a semi-trailer, and is leading to trucks of the type where the driver's seat is over the engine to cut down the over-all length.

As regards servicing, I am not as familiar as I would like to be with this part of the operation as our business does not call for this type of vehicle. As far as I have been able to find out from other contacts, however, there is no particular need for any special service on a semi-trailer over and above that given to any large truck.

As far as streamlining is concerned, it is only a question of eye appeal in trend with the modern demand. Streamlining is effective only at high speeds. It is almost impossible to make an actual streamline job on a truck of any kind, and again, we have legislation in effect, or under consideration, to limit the speed of all trucks. At this moment there is a proposal in New York State to limit the speed on all state highways to a maximum of 50 miles an hour for passenger cars and to 40 miles an hour for trucks.—C. L. JONES, *Automobile Division General Foods Sales Co. Inc. New York N. Y.*

Not As Safe

OUR OPINION is as follows:

1. Semi-trailers are not as safe to operate as conventional trucks, for two reasons:

a. There is always danger of "jack-knifing."

b. There is always a chance that the pin on the fifth wheel will break and allow the body and trailer to crash into the cab.

2. We have not experienced any trouble with semi-equipment over straight jobs other than the fact that it is difficult to keep the brakes on the trailer working in unison with those of the tractor.

3. There is always value in streamlining any body, whether semi-trailer or straight job, because streamlining tends to reduce wind pressure. This, of course, means less strain on the motor pulling these jobs and reduced gasoline consumption. However, this can be carried to an extreme, as too much streamlining of a body will cut its carrying capacity.—A. E. SINCLAIR, *Plant Superintendent, Kingan & Co., Indianapolis, Ind.*

Streamlining Saves No Gas

WE FIND that the only advantage in using a streamlined body lies in the fact that it is more attractive and has a greater advertising value than the old square body. So far as we are able to learn, it requires practically the same gasoline for the streamlined and the old style body.—R. A. RATH, *Secretary, Rath Packing Co., Waterloo, Ia.*

Trailers Not As Safe

WE ARE sorry to advise we haven't found semi-trailers as safe to operate as conventional trucks.

The fifth-wheel lock has required the most servicing.

Unless the bodies are lower, we cannot see any value in streamlining.—E. BARBER, *Sales-Service Department, Abbotts Dairies, Inc., Philadelphia, Pa.*

Favors Streamlining

ANSWERING your questions on trailer operation:

1. To my knowledge, no.

2. No experience in regard to servicing.

3. Streamlining improves appearance, also tends to balance unit more evenly. Streamlining should be carried as far as possible.—GEORGE E. GREANEY, *Diamond Ginger Ale, Inc., Waterbury, Conn.*

Trailers Considered Safe

WE HAVE NOT operated our trucks long enough to speak from much experience. We feel, however, that our tractor-trailer equipment is just as safe to operate as any other equipment which we could have. We further find that the tractor will require more servicing than the trailer.

The streamlining idea, of course, is one that we feel is entirely up to the company operating the trailer. No doubt this does help to some extent in cutting wind resistance, and one must also consider the modern appearance and attractiveness of this type body from an advertising standpoint.—A. P. PHILLIPS, JR., *Vice-President, Phillips Packing Co., Inc., Cambridge, Md.*

The PLANT NOTEBOOK

Five dollars will be paid for brief stories which are suitable for use in this department. Sketches or photos should be provided whenever possible.

Making Butter without Starter

CREAM that has soured spontaneously for a moderate length of time and is churned without starter will produce butter with aroma. But cream that has soured so long that diacetylmethylcarbinol has disappeared will not produce aromatic butter unless starter is added.

Butter made from sweet, unripened cream has not been without fault. It has been subject to poor keeping quality manifesting itself as cheesy flavor and a flavor called surface flavor in Canada. This surface flavor is very troublesome in late summer and early fall in Canada, where a great deal of sweet cream is made into butter without starter or ripening. One creamery claims to have overcome this trouble by adding one ounce of edible 80 per cent lactic acid to 100 lb. of butter at the time salting is done. This practice again points to a happy medium of not too little nor too much acidity to secure a stable keeping quality. Adding starter and ripening cream properly are a natural and proven way of producing proper acidity and aroma in butter.

The acidity of butter is a very important factor and, of course, affected by starter. The pH of satisfactory butter ranges from pH 5.8 to pH 6.8. Although this pH covers almost the same range as in fresh sweet milk, and extends only a little farther on the acid side, it is not quite attainable by churning sweet cream. By all evidence, the behavior of butter in the making of which ripening, or starter, or lactic acid were used, is very different. Such butter possesses better keeping quality.

It may be possible to reduce the cost of starter by re-enforcing it with citric acid. Aroma is produced by diacetylmethylcarbinol, resulting from a fermentation of citric acid. All milk contains some citric acid, but an addition of citric acid increases the aromatic property of starter. If 125 lb. of skim milk costs $1.09, then 62 lb. of skim milk plus 0.093 lb. of citric acid, costing 2.7 cents, makes a total cost of 58 cents. This reinforced starter has double the aroma of the ordinary starter and the 62 lb. should flavor a churning of butter the same as 125 lb. of ordinary starter and at a saving of 51 cents, or 47 per cent.

Another way to reduce expense of starter is to work a small amount of starter directly into the butter at the time of salting. This has been tried many times with a large proportion of poor results, because too much starter was added. The smaller proportion of good results indicates that this method may be feasible if not overdone. If no starter is added to cream and the cream churned at low acidity, then the amount of starter to try on 1,000 lb. of butter is from 1 qt. to 1 gal. —F. W. BOUSKA, *at Meeting of American Association of Creamery Butter Manufacturers, Dec. 3, 1935, Chicago, Ill.*

Aids Casing Cleaning

WASHING casings to be used in sausage manufacture is facilitated by a special table and flushing nozzle at the Mineola, N. Y., plant of Wilson & Co. Made of stainless steel, the table has a tank at one end in which the unwashed casings are placed.

One end of the table top is flush with the tank, and the table is slightly inclined so that it drains into the tank. A drain pipe with an opening about 4 in. above the bottom of the tank keeps the water at a constant level.

To flush the inside of a casing, the operator pulls its end over a 1-ft. length of ⅜-in. pipe through which the cleansing water flows. This pipe connects to a valve in a common outlet between hot and cold water supply

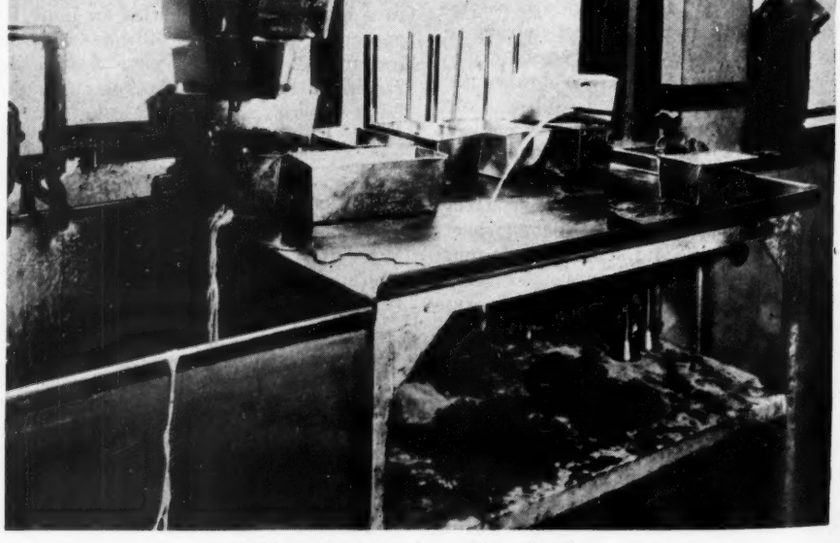


Table and nozzle for casing cleaning.

lines so that the water is turned on when the pipe is raised about 3 in. above the table top. This relieves the operator of the necessity of manipulating the valve.

Movable Racks

PLATFORMS or racks that are equipped with casters and can be readily moved from one part of the plant to another, provide a means of saving space and relieving congestion when used in the storage of containers or materials.

In one plant a number of these were constructed for the purpose of handling bulk milk and ice cream cans and they proved to be a great success. These were made with three trays, 28x38 in., and, when mounted, the completed rack stood 48 in. high. Two casters and two 6-in. diameter wheels were used for mounting each rack.

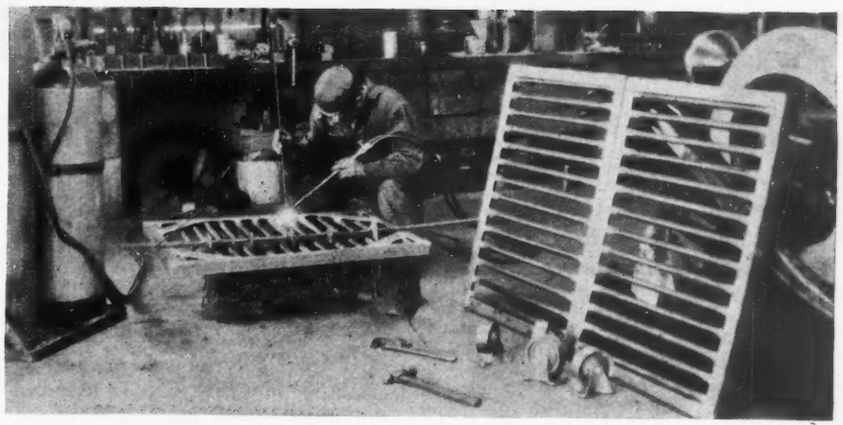
The trays were constructed with welded angle-iron frames, using $1\frac{3}{4}$x$1\frac{3}{4}$x$\frac{3}{16}$-in. angles, welded at the corners. The bottom tray has corner gussets welded in to provide a means for bolting the wheels and casters in place.

In addition to the advantages already cited, we have found these "dollies" useful in loading trucks, because with one opening of the cooler door a much larger number of cans can be moved out to the truck.

As the large "dollies" proved so successful, we made some smaller, single platform ones which we call "deuces." These serve to increase the ease of handling cases of milk to stores, restaurants and similar stops, and have but one tray, mounted on four casters of 3-in. diameter. They are used by wheeling them directly onto the truck at our plant, with the load in place. The load can then be easily wheeled off at the customer's premises, the "deuce" unloaded, and brought back to the plant by the truck. One of them can be seen in the empty-can compartment of the truck in one of the illustrations.

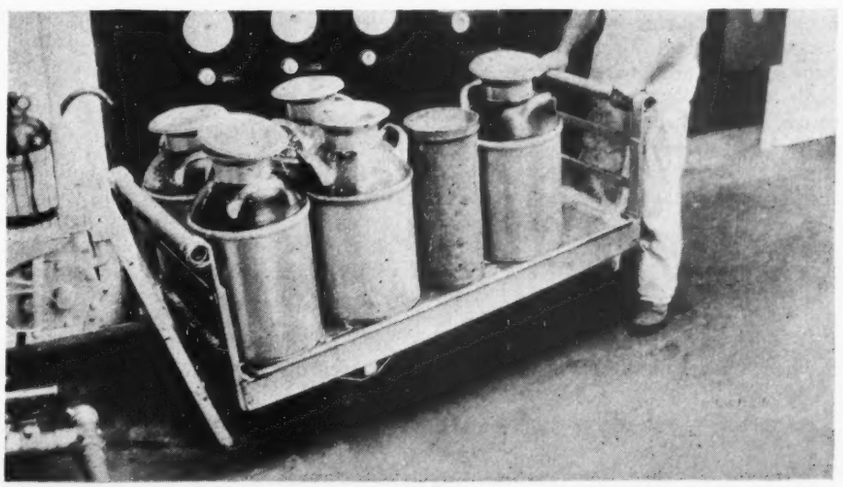
These small platforms are constructed with frames of $1\frac{1}{2}$x$1\frac{1}{2}$x$\frac{3}{16}$-in. angle iron, welded. Two cross-pieces, of $1\frac{1}{4}$x$\frac{3}{4}$-in. steel are welded in place to brace the frame and provide mountings for the casters.

One of the illustrations shows a corner of the plant shops with a "dolly" tray in course of construction. The manner of holding the pipe cross-pieces in place while welding, by C-clamps and bars, can be seen.



Fabricating movable platform trucks in the plant shop by welding.

Large movable tray platform or rack beside truck, with small movable tray platform show in empty-can compartment of truck.



Another type of movable platform truck used for carrying milk cans made in the plant shop by welding

The third photograph included with this article shows another useful handling device made in our plant by welding. It is a large platform truck used for handling ingredients and products in cans. The feature of this truck is that it can be equipped with side bars to prevent cans from sliding. These bars are of $\frac{1}{2}$-in. diameter pipe with special ends brazed in. The ends are so shaped as to bear against the inner side of the handle uprights and hook over the ends of the truck. When not needed the bars can be removed. One of the bars can be seen in the photograph in position along the edge of the truck platform.—BILLIE BURGAN, *San Diego, Calif.*

NEW EQUIPMENT
for Food Manufacturers

Laboratory Aspirator

For flour mills, rice mills, cereal products plants and other similar establishments, Ricetown Sample Devices Co., Stuttgart, Ark., has brought out the "Bates Laboratory Aspirator." The purpose of this device is to make quick separations of grain from chaff or other undesired substances. This device, which holds a 5-lb. sample, or can be fed continuously, is 22 x 10 in. and 27 in. high, weighs 60 lb., and operates with a 250 watt motor. It is available in two materials: galvanized iron, finished in synthetic aluminum lacquer, or solid brass.

Non-Skid Flooring

Flooring material has been introduced by Acme Steel Company Chicago, Ill., which is called "Heavy Duty Floor Steel." It is claimed that this provides a long-wearing, non-skidding floor surface in which cracks, holes and ruts cannot develop.

The new construction consists of a network of small mesh, 1¼x1¼ in., made of heavier sections of rolled steel than were formerly used. This reinforcement can be used in either new or old floors over concrete, brick, wood or any other surface. It is laid flush with the finished floor line and filled with concrete, or asphalt mastic, as desired. The mesh comes in one piece rolls containing 100 sq.ft. and when laid these rolls are joined together with steel pins inserted three to the lineal foot.

Factory Trucks

Platform hand trucks, for use within the factory, called the "Service Push—EZ" trucks, have been introduced by Service Caster & Truck Co., Albion, Mich. These trucks are available in two sizes, 4,000 lb. and 6,000 lb. capacities, when equipped with steel wheels. When rubber or Textolite wheels are used, the respective capacities are 2,000 and 2,500 lb. Five sizes of platform are available: 24x48 in., 24x60 in., 30x60 in., 36x60 in., and 36x72 in. Platforms are of hard maple, or 10-gage steel, as desired. Handles are of 1 in. pipe. All wheels ar equipped with Hyatt bearings.

Air Filter

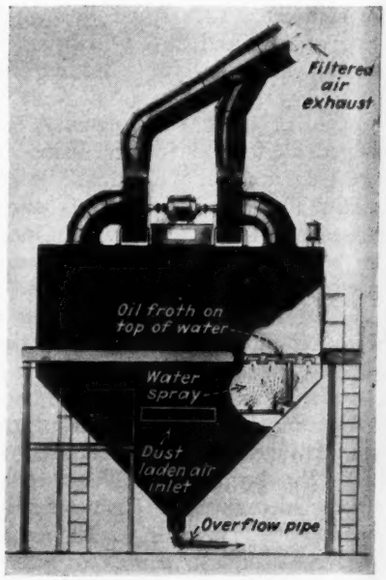
C. O. Bartlett & Snow Co., Cleveland, Ohio, is now manufacturing an air filter of the "froth flotation" type. In this device, dust-laden air is drawn through ducts to an equalizing chamber. From there it passes upward through bubble caps into a water bath which is covered with an oil film. After passing through this film, the air enters an upper chamber, from which it is discharged by a fan. Large dust particles are removed by the water, while the finer particles are trapped by the oil. Tests on dust, 25 per cent of which passed through a 200 mesh screen (75 per cent ranging from 2 to 10 microns in size) are said to have shown an efficiency of not less than 99.8 per cent by weight. Dust passages as low as .015 grains per cubic foot are claimed not to be unusual.

Portable Sifter

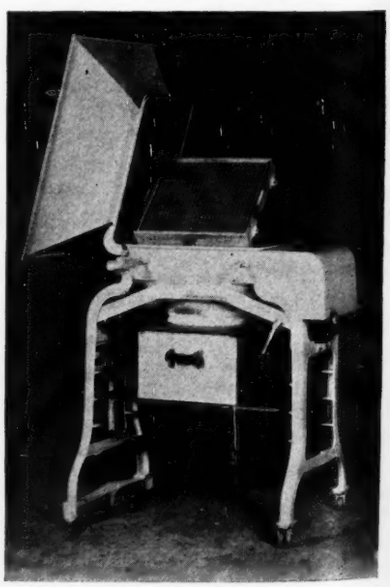
For sifting flour, sugar and other dry ingredients, Hinkle Machine Co., Hanover, Pa., has developed a small, portable, motor-driven sifter known as the "Sift-Al." As shown in the illustration, the screens are held in a removable frame. Three screens are used, 10, 12 and 14 mesh, respectively, although coarser or finer screens can be substituted when necessary. These are of tinned, corrugated steel.

The hopper has 100 lb. capacity. Motor is of ¼ hp. Machine is 34x24 in., and 52 in. high; and weighs 425 lb.

By sifting the material successively through three screens of increasing fineness of mesh and with the new method of screen oscillation used, it is claimed that this device insures the maximum amount of air incorporation without the aid of brushes or other friction devices.

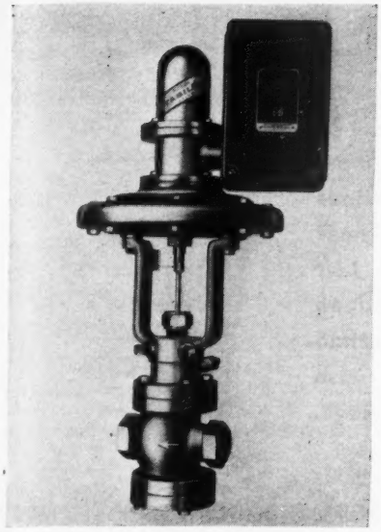


Air filter of "Froth Flotation" type.

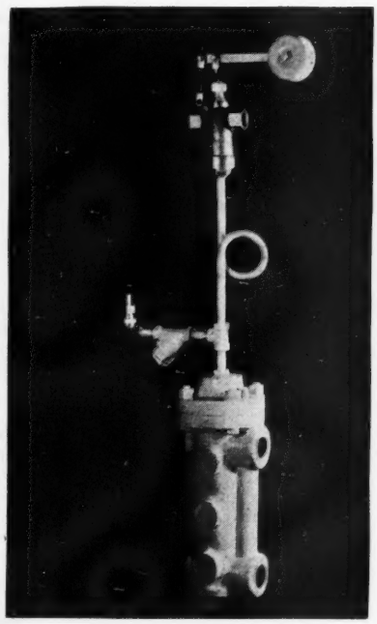


Portable sifter.

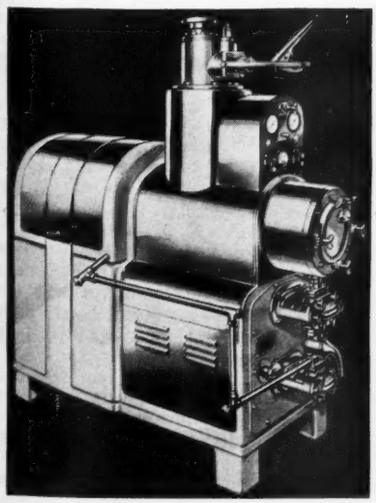
Laying Floor Steel in trucking aisles.



Accessory prevents control valve from sticking.



Boiler make-up water control.



New continuous freezer for ice cream.

Control Valve Accessory

TO ELIMINATE valve sticking and assure accurate valve positioning of its air-operated control valves, The Foxboro Co., Foxboro, Mass., has developed a new device which they call the Vernier Valvactor.

This device is said to enable the throttling type air-operated control instrument to make small, gradual adjustments of the control valve position regardless of friction or hysteresis. It is claimed that the air from the control instruments need change as little as ½ in. of water pressure to cause a corrective positioning of the valve and force the stem to take a position within 1/1,000th of an inch of the previous one.

Boiler Make-up Control

TO PROVIDE make-up water automatically as a boiler demands, Morehead Manufacturing Co., Detroit, Mich., has introduced a new device. This is for use with the Morehead "Back to Boiler" system and can be used in connection with any other similar system of returning condensed steam to boilers.

Continuous Freezer

BUILT in three sizes, 60, 150 and 300 gal. per hour, a new continuous freezer has been added to the line of dairy products equipment manufactured by the Creamery Package Manufacturing Co., 1243 West Washington Blvd., Chicago, Ill.

In this freezer the housing contains the freezing cylinder, dasher, motor and all accessories within a compact unit. The ice cream mix is pumped continuously into the back end of the cylinder. A second pump draws the frozen product at uniform pressure sufficient to carry it through pipelines and into can and package filling attachments.

A direct expansion flooded ammonia system similar to that used on batch freezers made by this company is employed. It consists of all the elements employed in the regular Creamery Package ammonia control system and all parts are contained in a single unit which is integral with the freezer cylinder jacket.

A fruit feeder and mixer is offered as an accessory and is built in sizes to correspond to each freezer. It provides for uniform flow to synchronize with the ice cream flow from the freezer. The new equipment is said to permit accurate over-run control at all times and it operates at high suction pressure, which is claimed to permit saving in refrigeration costs. Labor savings are also made, particularly where a large volume of ice cream is to be packaged.

Four-Wheel Drive Truck

COMPLETE safety is said to be featured in the new 1936 line of auto trucks developed by the Four Wheel Drive Auto Company, Clintonville, Wis. These safety features include: The set-back front axle and powered front wheels which permit positive steering through a more equal distribution of power and load. The rapid acceleration, for ease of operation in traffic and emergencies, provided by the extra traction of four driving wheels. Quick stopping in traffic and other stops because of the use of two sets of independent four-wheel brakes. These brakes are the hydraulic service brakes, booster operated, and the parking brakes which act on all four wheels through the driving mechanism.

In addition to the above features, the design has been streamlined and extra precautions have been taken to prevent entrance of carbon monoxide to the driver's cab.

Correction

IN THIS department in February, 1936, there appeared a description of the Harris milk evaporator. The capacity of this evaporator as then stated was incorrect and the item should have read as follows:

"A batch of 200 gal., 3 to 1 concentrated milk, is finished in 74 minutes, with a steam pressure of 4 lb. in the coils, a 26-in. vacuum and temperature of milk in the pan at 119 deg. F."

Four-wheel drive truck.

The Manufacturers Offer

For your convenience, Food Industries lists the most recent catalogs, bulletins and other publications received, of interest to food manufacturers. These are grouped into classes and each is numbered. List the numbers that you want on the coupon. One coupon will bring you the bulletins you need. If this method of listing bulletins is helpful to you and you wish it continued, please check the coupon on this page.

Food Plant Equipment

1. DISINTEGRATING EQUIPMENT — Robinson Mfg. Co. Bulletin No. 36-D, 32 pages, illustrated catalog of crushing, grinding and pulverizing equipment.

2. INDUSTRIAL EQUIPMENT—L. O. Koven & Brother, Inc. Loose-leaf general catalog of processing equipment, including cookers, coolers, dryers, evaporators, extractors, kettles, mixers, ovens, separators, tanks, washers, and many other designs for all food products.

3. DISINTEGRATING, MIXING AND SEPARATING EQUIPMENT—Abbé Engineering Co. Bulletin 40, illustrated catalog of cutters, grinding mills, mixers and sifters, for foods and other products.

4. MIXERS—Robinson Mfg. Co. Bulletin No. 32-D, illustrated catalog of "Gardner" and "Unique" mixers, for foods and other products.

5. INDUSTRIAL EQUIPMENT—F. J. Stokes Machine Co. Catalog No. 35, a 48-page illustrated catalog of process equipment such as dryers, extractors, evaporators, mixers, stills, tablet machines and other equipment for food manufacture.

6. SECOND-HAND EQUIPMENT — Consolidated Products — Spreckels Liquidation. Catalog of machinery and equipment included in the liquidation sale of the Spreckels sugar refinery, including all processing, power and packaging equipment from a refinery rated at 4,000,000 lb. of raw sugar per day capacity.

7. SEPARATING EQUIPMENT — Robinson Mfg. Co. Bulletin No. 41-D, illustrated catalog of "Gyro-Sifters" for producing accurate separations of material by size, from 2 to 250 mesh.

8. CANNING MACHINERY AND SUPPLIES—Anderson-Barngrover Division, Food Machinery Corporation. General Catalog No. 120, of fruit and vegetable canning equipment, supplies and accessories.

9. CANNING MACHINERY AND SUPPLIES—Sprague-Selles Corporation. General Catalog No. 200, describing this company's complete line of vegetable and fruit canning equipment and accessories.

10. PACKING MACHINERY — Parker Machine Works. A loose-leaf catalog entitled "Parker Products Geared to Meet Modern Demand," describing this company's line of equipment for use in crating and packing fresh fruits, eggs and other products.

11. CANNING AND PACKING MACHINERY —Food Machinery Corporation, Florida Division. New general catalog of fruit and vegetable packing and canning machinery for citrus fruits, potatoes and other products.

12. GRADERS, FRUIT — John Bean Manufacturing Co. 12-page catalog of Bean (Cutler) Diameter Graders (round hole belt type) for grading fruit.

13. CLEANERS—John Bean Manufacturing Co. Catalog L-273, 12 pages, describes cleaners for apples, peaches, potatoes and onions.

14. FRUIT PREPARATION MACHINERY — Cutler Manufacturing Co. 14-page catalog of equipment for sorting, sizing, washing, drying and conveying fruit.

15. GRADERS, FRUIT—Cutler Manufacturing Co. 4-page bulletin describing the Rotary Bin Grader for fruit.

16. PACKING MACHINERY—Cutler Manufacturing Co. General catalog of fruit and vegetable packing machinery including graders, box presses, sorting equipment, conveyors, cleaners and other equipment.

17. PACKING MACHINERY — Citrus Machinery Co. Catalog R-120, describes a complete line of modern machinery for packing fresh citrus fruit.

18. WASHERS — John Bean Mtg. Co. Folder describing Model E (400-600 bu.) and Model F (700-1,000 bu.). Under-Brush Flood Type fruit washing equipment.

19. PACKING EQUIPMENT — John Bean Mfg. Co. Catalog L-300, showing the complete line of sprayers, dusters, cleaners, washers, and graders for fruit and vegetable packers use.

20. PROCESS EQUIPMENT — B. F. Gump Co. General Catalog describing, specifying and illustrating coffee plant equipment, Draver feeders and continuous mixing systems, Vibrox packers for bags, barrels and other containers, Edtbauer-Duplex automatic net weighers, miscellaneous canning, packing and other machinery and supplies.

21. PUMPING EQUIPMENT—Worthington Pump and Machinery Corporation. Four new bulletins, as follows: Type GS internal sleeve bearing, double helical rotary pumps; Type GR internal roller bearing double helical rotary pumps; Type GE external ball bearing double helical rotary pumps; Type TA horizontal duplex piston pumps for liquids up to 75 lb. pressure.

22. REFRIGERATION COMPRESSORS — Frick Co. Bulletin No. 508-A, describing enclosed type Freon compressors and their applications for refrigeration and air conditioning.

23. MONORAIL CONVEYORS — American Monorail Co. 24-page illustrated catalog describing the "Monotractor" a new type of electric drive for monorail hoisting and conveying units, and showing typical applications.

24. DISINTEGRATING EQUIPMENT—Pulverizing Machinery Company. General catalog, 32-pages, detailing the construction, specifications and applications of "Mikro-Pulverizers" for producing accurately sized disintegrations of food materials and other substances.

G. L. Montgomery, April, 1936
Managing Editor, Food Industries,
330 W. 42nd St., New York, N. Y.

TO THE READER: Use this convenient form to get the bulletins you need.

Please send me the bulletins indicated by the following numbers:_____

_____

_____

Please Print {**Employer** _____ **Your Name** _____

{**Position** _____ **Your Address** _____

Shall we continue this service? **Yes** _____ **No** _____

25. HOMOGENIZING EQUIPMENT—Cherry-Burrell Corporation. Bulletin No. G-265, describes the laboratory model "Viscolizer," a small homogenizer with a capacity of 25 gal. per hour.

26. REFRIGERATING EQUIPMENT—Carbondale Machine Corporation. Bulletin 1107, giving specifications for vertical duplex type refrigeration compressors in 5x5 in. sizes and smaller.

Plant Supplies and Accessories

27. FOOD EQUIPMENT PACKING—Greene, Tweed & Co. "Klero" non-contaminating lubricated packing for use with pumps and other food-handling equipment is described in a new folder.

28. PAINT—Pittsburgh Plate Glass Co. Color card showing the various shades available in the "Glorified Light" line of industrial-plant paints.

29. PIPE FITTINGS, SANITARY—Crane Co. Bulletin showing the line of "18-8" chrome-nickel sanitary pipe fittings and sanitary valves for food plants.

30. BALL AND ROLLER BEARINGS—Fafnir Bearing Co. Engineering Manual No. 35, 197 pages, gives a comprehensive discussion of the principles affecting the selection, application and operation of anti-friction bearings, also fundamentals involved in correlating design requirements, load characteristics and service conditions to choice of bearings. Gives specifications, weights and prices of Fafnir products. Available only to those responsible for bearing selection or maintenance.

31. PIPING AND TUBES—Steel & Tubes, Inc. 16-page booklet listing and describing various types of steel piping and tubing for industrial purposes.

32. PILLOW BLOCKS — SKF Industries, Inc. 8-page booklet discussing the Type FA pillow block, a roller-bearing unit for heavy duty rotating parts.

33. PAINT—Sherwin-Williams Co. "Save-Lite," a 34-page booklet giving an analysis of plant conditioning by means of painting, covering such factors as lighting, the value of proper illumination, and painting maintenance.

Packaging

34. CLOSURES—Aridor Company. A convenient wall chart, illustrating closures made by this company and listing sizes and specifications, designed to facilitate selection and ordering.

35. CLOSURES — Anchor Cap & Closure Corporation. New folder, "Keeps Quality In," illustrates the Anchor line and discusses the sealing qualities of Anchor D caps for glass containers.

36. PACKAGING MATERIALS—Riegel Paper Corporation. "Case Histories of Packaging," a folder of eleven case histories of how and why papers are selected for successful packages.

37. PACKAGING MATERIALS—Riegel Paper Corporation. Sixteen popular packaging papers are shown by samples and are described, with recommendations for applications, in a new folder.

38. CONTAINERS—Hinde & Dauch Paper Co. "Modern Shipping Boxes" is a loose-leaf folder of 28 pages illustrating the design and construction of various types of corrugated fiber containers.

39. PACKAGING MATERIALS—Sylvania Industrial Corporation. Sample book showing various types of plain, moisture-proof, embossed, rancidity retarding and colored "Sylphrap" transparent cellulose sheets.

40. CLOSURES—Aluminum Seal Company. "Alseco Seals Increase Sales," a 28-page bulletin showing application of various types of Alseco closures, and the machines used for applying them.

41. PACKAGING MACHINERY — Gummed Tape & Devices Co. Folder describing the Packer No. 30 shipment sealer, a device for dispensing moistened gummed tape for package sealing.

42. PACKAGING MACHINERY—Stokes & Smith Co. Three new bulletins, each of four pages, describe and picture the following equipment: Auger feed filling machines; "Neverstop" carton filling and sealing machines; Tight wrapping machines.

43. PACKAGING MACHINERY—Pneumatic Scale Corporation, Ltd. Three new bulletins: No. 26, dealing with the automatic packing and weighing of flour in bags; No. 28, discussing automatic capping machines for applying closures to containers; No. 43, giving an outline of modern practice in the bottling of wines and liquors.

Trucks, Tractors and Accessories

44. INSULATION — Armstrong Cork Co. Folder discussing the application of "LK" corkboard for the insulation of the bodies of food handling trucks.

45. SIZE AND WEIGHT REGULATIONS — Four Wheel Drive Auto Co. A 54-page booklet summarizing the laws in effect in 1936 in the 48 states, restricting size and weights of trucks and trailers on public highways.

46. TIRES, RIMS AND SUPPLIES—Firestone Tire & Rubber Co. The Firestone Data Book, a 72-page booklet containing data to aid in selecting tires, rims, and other supplies for trucks, trailers, tractors and other industrial vehicles.

47. TRAILERS — Fruehauf Trailer Co. "Executive Thinking," a revised edition of a 16-page booklet giving the cost-saving reasons for the use of trailers for hauling factory products.

48. TRUCKS — Four Wheel Drive Auto Co. A 12-page illustrated booklet, describing the new 1½-ton, HS Model of four-wheel-drive truck for high speed hauling.

Control Equipment

49. ALKALINITY CONTROL—Mathieson Alkali Works. The Lehmkuhl alkalinity controller, made by this company, and its use in automatically controlling the alkalinity of washer solutions, is discussed in a 4-page bulletin.

50. TEMPERATURE REGULATION — Fulton Sylphon Co. Bulletin No. 20 describes temperature regulators for liquids and illustrates numerous applications with line drawings. 25 pages.

51. CONTROL OF pH—Leeds & Northrup Co. Bulletin 709-B, 12 pages, entitled "Improved Gassing of Beet Juices," describing the application of the "Micromax" pH recorder in the beet sugar industry.

Pest Control, Bacteria Control, and Sterilizers

52. BACTERIA CONTROL—Mathieson Alkali Works. A folder "Bacteria Control in the Dairy Plant," discusses the use of "Lo-Bax" bactericide in obtaining low bacteria counts in milk and milk products.

53. PEST CONTROL — West Disinfecting Co. Twelve-page bulletin, "How to Get Rid of Rats," discusses rat control through the use of "Ratmort," a product containing red squill.

54. PEST CONTROL—R. & H. Chemicals Division, E. I. du Pont de Nemours & Co., Inc. A series of bulletins discussing fumigation for the control of insect and other pests, as follows: (a) "The Pest Menace Can Be Controlled"; (b) "Fumigation Protects Life and Property Against The Pest Menace"; (c) Fumigation Pointers, Vol. 2, No. 1; (d) "Effect of Hydrocyanic Acid Gas" on foods, fabrics, metals and other commodities; (e) "Standard Practice For Fumigating Atmospheric Fumigation Vaults," for insect control in infested foods; (f) "Fumigation of Flour Mills"; (g) "Standard Practice," for fumigating industrial structures; (h) "R & H Dosage Schedule," for the fumigation of industrial structures; (i) "R & H Fumigation Planning Chart."

Sanitation Supplies

55. SANITATION SUPPLIES—West Disinfecting Co. "The Scope of Sanitation," a 60-page general catalog of sanitation supplies, including disinfectants, cleaners, soaps, towels, receptacles, deodorizers, floor maintenance products, and insecticides.

Chemical Materials

56. CHEMICALS—Chas. Pfizer & Co., Inc. March, 1936, price list of chemicals, including citric acid, tartaric acid, gluconic acid, etc.

57. COLORS, FLAVORS—Fritzsche Brothers, Inc. March, 1936, price list of chemicals, including colors, flavors, essential oils, etc.

Materials of Construction

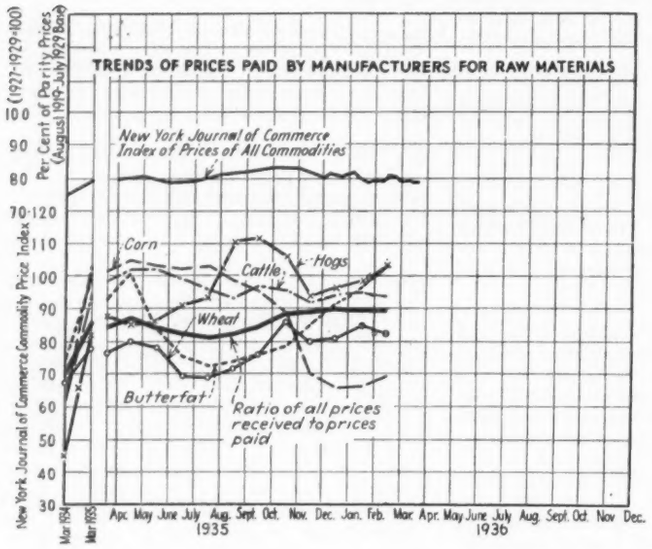
58. FLOORING—Drehmann Paving & Construction Co. "Better Floors," a 16-page bulletin describing the application and use of acid, grease, water and wear resisting floors of Drehmann floor brick in food plants.

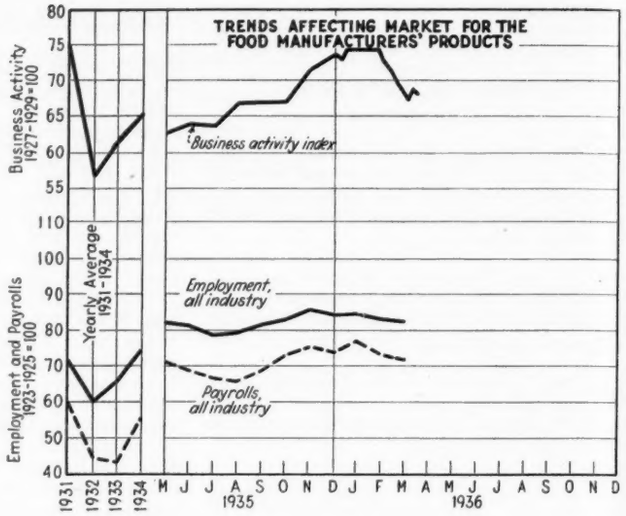
59. NICKEL CLAD STEEL—Lukens Steel Co. Corrosion-resistant nickel-clad steel applications in the fabrication of food processing equipment are listed, discussed and illustrated in a 24-page bulletin.

60. TANTALUM — Fansteel Metallurgical Corporation. Catalog of 48 pages describing the properties and industrial and laboratory applications of metallic tantalum and its alloys.

61. FLOORING REPAIR MATERIAL — Flexrock Co. Folder describing "Rugged-Wear Resurfacer," a material for repairing industrial plant floors.

BUSINESS TRENDS


TRENDS OF PRICES PAID BY MANUFACTURERS FOR RAW MATERIALS
New York Journal of Commerce Index of Prices of All Commodities
Corn
Cattle
Hogs
Wheat
Butterfat
Ratio of all prices received to prices paid
New York Journal of Commerce Commodity Price Index (1927-1929=100)
Per Cent of Parity Prices (August 1909-July 1929 Base)
1935
1936



Sugar in 1935

FINAL figures for sugar distribution in the United States, in 1935, as given by Lamborn & Co., show an increase in the total over 1934 of 4.9 per cent. This equalled 5,869,926 long tons, raw sugar value, as compared to 5,593,779 in 1934. Of this total, cane sugar accounted for 4,543,487 tons, as compared to 1,326,439 tons of beet sugar.

Exports of United States refined sugars, including that sent to Alaska and insular territories, totaled 104,590 long tons, compared to the 1934 total of 125,147, or a decrease of 16.4 per cent.

World consumption and production figures are gathered with reference to the crop year, Sept. 1 to Aug. 31, rather than the calender year. On this basis, consumption for the year ending Aug. 31, 1936, is estimated at slightly over 28,000,000 long tons, raw sugar basis. This will make the year the largest on record by some 800,000 tons. Production still lags behinds consumption, as it has since 1930-31. However, this lag is only making slight impressions on the supply of sugar in storage, which at the end of 1935 was still estimated at about 9,000,000 tons, down from the maximum of 12,362,000 tons stored in 1931.

More Maple Sugar

PRODUCTION of maple products in the United States in 1935, according to Lamborn & Co., amounted to 1,704,000 lb. of sugar and 3,377,000 gal. of syrup. In the previous year, the figures were 1,271,000 lb. of sugar and 2,395,000 gal. of syrup. Of the 1935 total, Vermont produced 51.5 per cent of the sugar and 43.9 per cent of the syrup, while New York, in second place, accounted for 27.1 per cent of the sugar and 29.6 per cent of the syrup. Authorities of the New York State Agricultural College, at Cornell University, predict an even greater output of maple products for the current season, beginning sometime last month.

Candy Business Booms

COMPLETE figures for the first month of the current year, now available, show that the confectionery business is operating at a considerably higher level than a year ago. Sales of confectionery and competitive chocolate products for February, 1936, totaled $19,566,455, compared with $17,920,449 in February, 1935. This was an increase of 9.2 per cent. The report, made by the Department of Commerce, is based on the sales of 300 manufacturers. Total sales, January-February, 1936, were $37,758,135, up 9.8 per cent.

Construction News

	Pending (thousands)	Awarded March (thousands)	Total Awarded 1936 (thousands)
Bakery	$74	$37	$782
Beverages	643	219	1,474
Canning and Preserving	315	....	....
Confectionery	80	....	....
Grain Mill Products	598	819	998
Ice Manufactured	100	37	224
Meats and Meat Products	1,350	....	241
Milk Products	433	267	568
Miscellaneous	383	449	596
	$3,976	$1,828	$4,883

Carbohydrate Trend

INCREASED consumption of sugar and mounting sales of confectionery, reported elsewhere on this page, are renewed evidence of the trend toward the replacement of bread and other carbohydrate foods of a starchy nature by sweet foods. Since the turn of the century, flour consumption, per capita, has steadily receded in the United States. The same tendency has also been noted in the consumption of potatoes. American consumers seem to be more and more of the opinion that necessary supplies of energy food can be more pleasantly obtained from sweets than from starches.

In view of the redoubled efforts of the bakers and millers to reverse this trend, and the continued potential world excess of wheat and other cereal production, it is significant to note the direction in which the carbohydrate tide still appears to be flowing.

Butter and Oleo

IN SPITE of increasing butter production, the price level has remained relatively high through March. The Chicago market quotation fell 3 cents during the four weeks from Feb. 26 to March 18, a period when a greater price decline might well have been expected. This price trend is apparently out of line with production, which has shown an expected increase for the month. Weather conditions, particularly the flood which disrupted transportation, may have been the cause.

As might be looked for, oleomargarine production has increased this year and is running about 10 per cent over 1935

figures, equaling 35 per cent of the butter production. For the full year of 1935, 378,676,669 lb. of oleomargarine, all types, were produced, compared to 262,899,654 lb. in 1934.

Meat Situation Easier

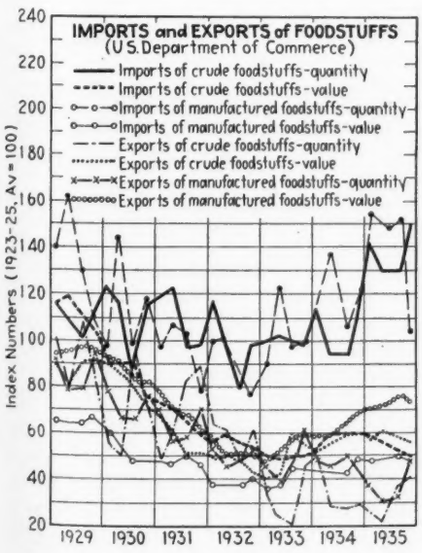
RECEIPTS of animals at stockyards were higher in March, with the quality of hogs somewhat improved, but cattle quality rather unsatisfactory. The latter situation was undoubtedly a result of the severe weather during February, which caused cattle shipments to be held up, and then, in March, released a rush of underfed animals when the weather abated.

As might be expected, both pork and beef prices fell to lower levels. By the first of the month, pork at retail was from 6 to 20 per cent below the October price, depending on cuts. Wholesale price declines were of the same order. Beef prices have also eased.

The outlook for the next few months in both cattle and hogs is for a slow continuation of the present trend. Hogs should feel the influence of increasing supplies more quickly, and by the fall should be approaching normal levels. It may be another year before the cattle situation shows a like recovery.

Vegetable Oil Shortage

GENUINE SHORTAGES in domestic production of vegetable oils continue. Contrasted to the average United States production, for the years 1929 to 1933, inclusive, of 6,516,000,000 lb., vegetable oil production in 1934 was 5,926,000,000 lb., and in 1935 was 5,001,000,000 lb. as reported by the U. S. Department of Commerce.



Per cent of parity prices are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data for imports and exports is from the U. S. Department of Commerce.

Business Decline Continues

SUSTAINED adverse weather conditions throughout the country have pushed general business activities to lower levels during the past month. Strikes and the persistently unsettled state in Europe have been contributory factors. However at 68.3 per cent of "normal," 1.58 per cent lower than five weeks ago, the *Business Week* index of business activity for the week ending March 21 is still nearly 7 per cent above that of a year ago.

Drought and dust storm conditions again plague the Midwest plains area, while floods have been reaching catastrophic proportions throughout the principle river valleys in the New England and East Central states. These conditions have interfered greatly with the production and distribution of food products. Their occurrence is too recent to be reflected in the present general prices of commodities.

Wholesale prices for all commodities reported by the U. S. Department of Labor for the month ending March 21 are 1.61 per cent lower. Those for farm products have decreased 4.00 per cent and, for food, 4.88 per cent. The New York *Journal of Commerce* general index of weighted prices fell 2.22 per cent during the same period. Grain and food prices dropped 5.89 and 5.85 per cent respectively.

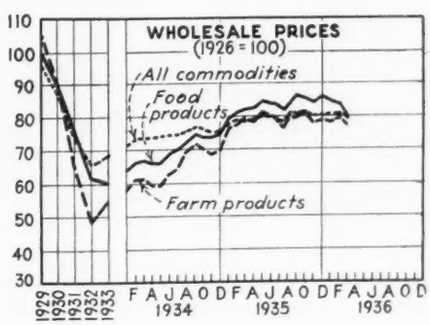
These figures indicate a deficiency of production below the average, in 1934 of 593,000,000 lb., and in 1935 of 1,515,000,000 lb., a total of about 2,100,000,000 lb. in the two years.

Consumption of vegetable oils in the U. S. is normally around 8,000,000,000 lb. per year. Normal imports are consequently about 1,500,000,000 lb. annually. Because of this situation, imports have sharply advanced in quantity.

Trends noted in connection with this situation are curtailed cotton production which has reduced the quantity of cottonseed oil; and the shortage of animal fats, putting an increased strain on the vegetable oil supply. In spite of this situation, consumption of fats and oils in the U. S. has been tending to increase. One new source of supply has been the rapid increase in the domestic production of soybean oil. However, this has made good no more than 10 per cent of the deficiency caused by the shortage of other supplies.

This situation would naturally be expected to raise the prices of fats and oils and, until recently, it did just that. However, since last summer the price of lard has dropped 40 per cent, and cottonseed oil prices are off 20 per cent from the level of last spring. These prices are now about on the 1909-1914 basis.

Probably the explanation of this lies in the change in the world situation, which has resulted in the disappearance of the former pressure to export these materials. European countries, in particular, are now becoming largely independent of imports of fats and oils. For instance, Consul L. L. Schnare, at Hamburg, reports that Germany now produces 45 per cent of domestic consumption, as against 35 per cent in former years. Slackening of the world demand, as thus indicated, has allowed the domestic price level to recede, and approach the domestic price level of other food products.



Indicators

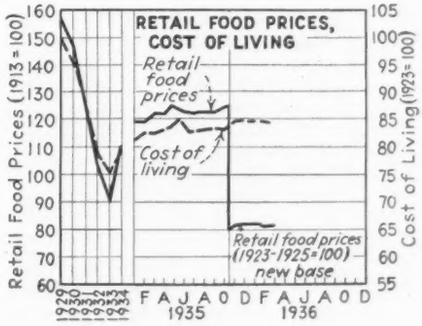
CARLOADINGS are running at levels from 8 to 10 per cent above 1935, with food product loadings showing some good gains.

COFFEE CONSUMPTION in February was the highest for any month on record, and at 1,390,709 bags was 38.4 per cent above February, 1935.

BEER CANS numbering 135,000,000 were sold by American Can Co. in 1935, as reported by President H. W. Phelps at the company's annual meeting.

SPINACH canning prospects for 1936 are threatened by floods in the California growing areas, said to have caused a 40 per cent loss in the spring canning crop.

SHEEP AND LAMBS on farms, Jan. 1, 1936, were reported at 51,673,000 head by the Crop Reporting Board, which number compares with 46,380,000 head the year before.



Books Received

AMERICAN MENU MAKER. By G. L. Wenzel. Published by American Menu Maker, 507 Fifth Ave., New York, N. Y., 1935. Looseleaf, 8½x11 in., cloth. Price $25 complete.

Food manufacturers maintaining their own dining room or desiring professional knowledge concerning portioning of food for institutional consumption will find this compilation a money saver or an excellent guide in the packaging of their products. The formulas given are all tested and actually used in successful hotels and restaurants. Being in loose-leaf form, the compilation is added to as formulas and recipes become authenticated. When finished the compilation will comprise at least 700 pages.

In addition to formulas and recipes, the compilation includes menu-making suggestions and buying suggestions, and specifies standard portions. It is sectionalized and thumb-indexed accordnig to food group classifications such as: salads, soups, beef, pork, vegetables, desserts and on through the whole list of types of foods used in the human diet.

SAUSAGE AND SMALL GOODS PRODUCTION. By Frank Gerard. Published by Leonard Hill, Ltd., 17 Stratford Place, London, W.1, England, 1935. 82 + XXIV pp., 6x9½ in., cloth. Illustrated. Price, 7s. 6d.

In this handbook on the manufacture of sausages and similar small goods meat products is given a general outline of methods commonly used in English small factories. All recipes are stated to have been personally tested by the author although not original with him.

TRAFFIC DICTIONARY. THIRD EDITION. By C. S. Nelson and Geo. T. Stufflebeam. Published by Shipping Service Organization, 2040 Grand Central Terminal, New York, N. Y., 1935. 224 pp.. 4⅝x6¼ in., cloth. Price $1.25.

Terms, phrases and abbreviations pertaining to domestic and foreign trade and shipping are listed in glossary style. They include the names and kinds of organizations, publications, documents, equipment, and services employed in the preparation, recording and handling of shipments by all means of transportation and cover warehousing, terminal and transfer facilities, claim procedure, practiced before the Interstate Commerce Commission, and transactions dealing with export and import trade.

GLANCES AT INDUSTRIAL RESEARCH. By Edward R. Weidlein and William A. Hamor. Published by Reinhold Publishing Co., 330 West 42d St., New York, N. Y., 1936. 238 + x pp., 5¼x7⅝ in. cloth. Illustrated. Price $2.75.

Technical research, whether conducted in an academic or an industrial atmosphere, is the foundation upon which industrial progress is built. If carried on in cloistered laboratories of ultra-conservative institutions of higher learning, its course may be of a highly impractical character or its results long withheld from those who can put them into use. If instigated and directed by highly commercialized forces it may be too opportunistic in its findings and too limited in the application to industrial use.

A blending of the academic and the highly industrial forces for carrying on research investigations is the function of Mellon Institute of Industrial Research and its industrial fellowship system. A presentation of the part Mellon Institute has played in recent technological advancement is the theme of this complement to Science In Action published five years ago. Operation of Mellon Institute and its fellowship system is explained, and case studies of research problems that have been solved are reviewed.

Malting Barley

(Continued from page 177)

tidase and saccharo-phosphatase studied[25, 26] are considerably increased in concentration during malting, they all lead to the production of inorganic phosphates from organic phosphoric acid esters.

Their great sensitivity toward high temperatures is worthy of note; they are partially destroyed during drying. It can also be shown that a cool, slow malting produces a malt with the largest enzyme content. The enzyme pyro-phosphatase has also been isolated from malt.[29] It is characterized by its ability to hydrolyze pyro-phosphates—important in the bio-chemistry of cell metabolism—to orthophosphate. The phosphates are vitally connected with the development of acid which is observed during malting, and has been shown to be enzymic in nature.[4, 30]

The enzymes considered previously are all characterized by their ability to degrade more or less complicated organic compounds into simple units through the course of hydrolysis. On the other hand, there is another group of enzymes which are concerned with the energy transformations of respiration and fermentation. They usually attack the simple carbohydrates and break the long chains into simpler units through cission of the carbon-carbon bond. In this way they are associated with oxidation and reduction enzymic transformations.

This group of enzymes is customarily designated as desmolases. Only a few enzymes of this type have been studied in germinating barley. The development of catalase, the hydrogen peroxide-splitting enzyme, has been studied[3, 4, 31, 32, 33] and found, as Fig. 5 shows, to increase three or four-fold. Peroxidase, however, remains substantially unchanged, according to one worker,[4] while others[3] found a significant increase for peroxidase and oxygenase.

All the energy-transforming enzymes finally indicate their presence most obviously in the very easily determinable respiration of the germinating grain. Among many individual observations of respiration[1] an interesting old study[34] may be mentioned. The most important result of this work is learning that a barley with high protein content and low thousand-grain weight—a small grained-barley—respires most. Consequently, higher protein content always leads to a more active respiration than does low protein content. Recently the intensity of respiration of the germinating grain was measured by modern methods,[35] and the results illustrated in Fig. 6 were obtained.

The large increase of respiration

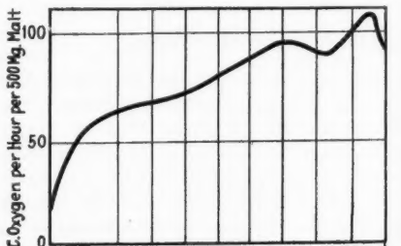


Fig. 6: Measurement of Respiration Intensity of Germinating Barley. Rate of respiration varies with the protein content of the barley. A small grain barley—one with a low thousand-grain weight and a high protein content—has the more active respiration.

with accelerating growth and the diminution resulting from the drying process is obvious. Also an increase in temperature of germination was found to produce a very considerable increase in rate of respiration. Because the respiration accounts for a considerable portion of the malt shrinkage, one can understand the effort of the technologist to minimize respiration as much as possible by means of cool malting or by minimizing the production of carbon dioxide. However, this effort can go only to the point that the vitality of the sprout, and with it the uniform and

(Turn to page 211)

Things Have Happened

- ***Floods damage food plants—An eyewitness account***
- ***Bakery engineers hold record convention in Chicago***
- ***Fifteen companies charged with tin-plate conspiracy***
- ***Administration completes plan for soil conservation***
- ***F & D A in drive on preserves; bans syrup in juices***

Flood Hampers Food Operations

Food manufacturers in thirteen states were put on their mettle last month by the disastrous floods. In addition to fighting the rising waters to protect their property, as described elsewhere in this department, plants in inundated areas were called upon to accelerate production in many undamaged factories and to inaugurate novel transportation methods to move their products through to marooned people.

Dairies were perhaps the most widely affected, these being hampered not only in production and distribution but in obtaining raw materials. In many sections farmers were unable to supply receiving stations. Many Eastern meat packing houses, too, were temporarily short on raw material, since railroads from the West could not carry the usual volume of livestock and dressed carcasses. Philadelphia and Pittsburgh packers were particularly affected.

But the problem of distribution caused the most grief. Canoes, rowboats and powerboats afforded the only means of carrying food into many areas, and these were decidedly at a premium. One large Pittsburgh dairy prides itself with getting a "corner" on the boats and maintaining its distribution 100 per cent. Another large food concern employed nineteen airplanes to supply bakers with yeast so that there would be no shortage of bread. An important New York dairy, while maintaining its distribution 100 per cent, estimated that it cost 13 cents a quart to get the milk through from flooded upstate New York.

For some of the manufacturers supplying retail groceries with the nonperishable commodities, the flood has a silver lining. It has been estimated that 1 per cent of the volume of goods in the country's groceries has been damaged by water, so that replacement orders will be forthcoming.

ASBE Holds Record Meeting

With an all-time high registration of 810, American Society of Bakery Engineers held its thirteenth annual meeting at Chicago, March 9-12.

Faced with statistical evidence that per capita consumption of flour has fallen from 228 lb. in 1900 to 160 lb. in 1935 and likely will go as low as 140 lb. in 1940, the practical-minded engineers placed particular emphasis upon production factors bearing on the consumption.

Dr. Gus Dyer, Vanderbilt University, as the inspirational speaker of the meeting, stated epigrammatically that: (1) "Every business group must think outside its business; (2) Too often business does not consider the ignorant consumer; (3) The consumer must be given what he wants and not what he needs; (4) There is no stabilized business; (5) There is a substitute for everything; and (6) People eat what they like."

From the afternoon session of the first day to the end of the meeting, flavor came in for major consideration. Composition of the products, mechanical handling of the doughs, size and care of baking pans, packaging and distribution were subjects of discussion by experienced production men and of criticism by spokesmen for the housewives. While price was not ignored, improvement in quality and distribution received major consideration.

Questionnaire returns were reported, showing that 61 per cent of the baking companies replying increased sales through the use of rich formulas for their bread, that 30 per cent depended upon medium-rich formula bread, and that 9 per cent sold bread composed of little more than flour and water. Those having grocery-store outlets used the richer formulas, whereas those serving hotels, restaurants and similar outlets to which several deliveries were made during a day relied upon the leaner-formula.

A market survey report revealed that at least 80 per cent of the women questioned wanted their bread to be not over four hours off the production line. Rich-formula bread retains its freshly baked flavor for as much as eight hours, whereas the lean-formula product loses flavor rapidly after about four hours.

A report was made of a survey to determine consumer reaction to unsliced bread of the bench-molded, slow-speed mixer type compared with the typical sliced bread of the machine-molded, high-speed mixer types. Of those replying, approximately 75 per cent preferred the hand-made type. Eighty per cent classed the machine-made type as "store bread." Both breads were made in commercial bake-shops.

Gordon Darnell, Los Angeles, cited slicing and wrapping as having unfavorable effects upon bread flavor and indirectly upon consumption; the thinner the slices and the more printing upon the wrapper, the greater the adverse effect. In rural districts, 9/16-in. slices were not considered objectionable,

Acme

SO THEY HAD FOOD

Uncle Sam's mail carriers have nothing on food delivery men when it comes to meeting an emergency. Here's an example of what the food companies did to get eats to residents in inundated sections. This is a scene in Pittsburgh.

BIG FOUR OF THE A.S.B.E.

Wm. J. Ocken (left), National Tea Co., Chicago, has been chosen by American Society of Bakery Engineers to direct its activities for the year. Assisting him (left to right), are John R. Roberts, Log Cabin Bread Co., Los Angeles, first vice-president; Robert W. Brooks, Standard Brands, Inc., New York, second vice-president; and Victor E. Marx, Bakers' Helper, Chicago, secretary-treasurer.

whereas in cities, ½-in. slices are often considered too thick. In "balloon" type loaves, $\frac{5}{16}$-in. slices help retain fresh flavor. Transparent wrappers were reported to have increased sales 25 per cent, as compared with wrappers of the heavily inked, non-transparent type. Effect of wrapper upon the flavor of the bread was given as the deciding factor.

C. G. Harrel high-lighted the value of "pilot-plants" in other industries in translating laboratory findings into commercial practice. He recommended their adoption by the baking industry as a meeting place for the chemist's knowledge and the bakery engineer's art for the solution of bake-shop production problems.

Selection, care, and use of bake-shop equipment; storage and handling of bakery product ingredients; treatment of ingredient water; methods of mixing and processing the ingredients; time and temperature controls exercised during operations and processing; accounting records kept of bake-shop operations, and means of cooling and making the finished products ready for delivery to retail outlets were also subjects of discussion.

March 8-11, 1937, was the date set for the next meeting; place, Edgewater Beach Hotel, Chicago.

More Soybean Research

RESEARCH on industrial uses of soybeans will be conducted at a new laboratory opened at Urbana, Ill., by twelve North Central States and the Department of Agriculture. This development follows the biggest production jump in the history of this crop in America. Forty million bushels were produced last year, this comparing with only a little more than 20,000,000 bu. in 1934 and 5,000,000 bu. in 1925.

Bans Sugar Syrup in Juices

ADDITION of water in the form of sugar syrup to products sold as fruit juices will no longer be tolerated by the Food & Drug Administration. Beginning July 1, legal action will be taken against interstate shipments of fruit juices containing added water regardless of label statements indicating the addition of sugar syrup. There is no objection to the addition of dry sugar, provided the labeling declares its presence.

Soil Plan Announced

DETAILS of the soil conservation program were announced March 21, these indicating that there will be this year an increase of 100,000,000 to 130,000,000 acres devoted to soil-improving and soil-conserving crops, as compared with 1930. Two types of payments will be made to farmers cooperating in the program. One will be a soil conserving payment averaging $10 an acre for the country as a whole; the other, a soil-building payment of up to $1 an acre. Five regional divisions of the AAA are to have charge of administration.

Conventions

APRIL

13-17 — American Chemical Society, semi-annual, Kansas City. Dr. Charles L. Parsons, 728 Mills Bldg., Washington, D. C., secretary.

16-17—American Management Association, production divisions, Hotel Statler, Cleveland. Alvin E. Dodd, 20 Vesey St., New York, executive vice-president.

20-22—Southern Bakers' Association, Miami-Biltmore Hotel, Miami. Jos. Baker, 107 N. Conception St., Mobile, Ala., secretary.

20-24 — Midwest Engineering and Power Exposition and Power Engineering Conference, Palmer House and International Amphitheater, Chicago, Ill. G. E. Pfisterer, 308 W. Washington St., Chicago, secretary.

MAY

7-8—Glass Container Association of America, White Sulphur Springs, W. Va. Victor L. Hall, 19 W. 44th St., New York, secretary.

10-12—Certified Milk Producers' Association of America, Hotel Baltimore, Kansas City. Seth W. Shoemaker, 1265 Broadway, New York, secretary.

29-June 3 — National Cottonseed Products Association, Roosevelt Hotel, New Orleans. S. M. Harmon, 1913 Sterick Bldg., Memphis, secretary.

Tin-Plate Conspiracy

FIFTEEN manufacturers of tin plate have been charged by the Federal Trade Commission with a conspiracy to boost prices. According to the complaint, these companies agreed in January, 1935, not to sell "stock plate" to jobbers or small manufacturers of cans and other containers. This practice would force the small companies to use the higher grade "production plate" instead of stock plate and force them to pay higher prices for it than the large companies with greater purchasing power, the FTC argues.

Packers Ask Rate Deduction

BY REQUESTING the Interstate Commerce Commission to permit them to continue deducting the cost of cargo insurance from the regular rates of common-carrier truckmen, the packing companies have laid themselves open to investigation to determine whether this is rebating.

Counsel for Swift & Co., Armour & Co. and Cudahy Packing Co. made the request at hearings, March 13.

Preservers Beware

THE government's fight to protect consumers against substandard preserves, jellies and jams, which has been dragging along for several years, is opening

up on a new front. Within the last few weeks numerous seizures of such products, lacking the proper fruit or fruit juice content, have been made as far apart as Boston, Mass., and Waukesha, Wis.

Flour Exports Subsidized

FLOUR exporters in Washington, Oregon and Idaho are taking eager advantage of the plan of Secretary Wallace to indemnify them for losses sustained in trade with the Philippine Islands. Figures as of March 14 show, that for the first two weeks of the plans operation 44,200 bbl. of flour had been shipped to the Philippines. The average indemnity amounts to 95 cents a barrel, 40 cents below the maximum.

The indemnity plan was developed to offset a swift decline in the amount of American flour used in the Philippines, this decline resulting from inroads by low-priced foreign flour. The percentage of American flour used had dropped from 85 per cent to less than 10 per cent.

Help on Rehabilitation

Valuable information about rehabilitating mechanical and electrical equipment can be obtained by writing FOOD INDUSTRIES.

Some equipment will not be worth saving, some will be worth patching up until new equipment can be purchased, and some can be made as good as ever.—THE EDITORS.

"Color Added" Oranges

FLORIDA is trying to give quality significance to oranges having artificially dyed skin, sold with the label "color added." A state law provides that such fruit shall have a high ratio of sugar to acid, an index of maturity and must not be colored beyond the shade normal for fully ripened fruit. Administration of this regulation, however, is difficult, and there also are federal food laws with which to contend. Florida growers and officials are virtually on notice that government inspectors will not wink at this new type of processing if carried to excess.

Flood and Destruction—An Eyewitness Account

E. S. STATELER, *Associate Editor of* FOOD INDUSTRIES, *was in Pittsburgh on March 15-18. His eyewitness account follows, showing how food manufacturers in the flooded area tried to cope with an unprecedented situation.*

IN the valley of the Allegheny River, which reaches a flood height at a level of 25 ft., are situated many food manufacturing and packing plants. To the executives of these plants, spring floods are nothing new. In fact they are expected.

But by Tuesday, March 17, after two days of rain and heavy snow throughout the Allegheny River watershed, this already swollen stream was rising at a rate of 0.7 ft. an hour, and warning had been received that a depth of 33 ft. could be expected by 7 o'clock next morning. Similar conditions existed along the Monongahela River, an unusual situation, since both streams seldom go on a rampage at the same time.

Although the river was still within its banks, the companies likely to be affected began, before noon, to put flood gates in place to minimize the flow of water into plant basements, and they removed everything possible to higher areas and upper floors. Sump pumps were tested, also.

In one of the plants visited, this protective work had proceeded so satisfactorily by about 6 p.m. that it was decided to keep only a skeleton crew on hand to complete the job and to add an extra night watchman to keep an eye on pumps and electrical equipment. By that time, the river had passed its flood level, streets in the lower places had begun to fill and water began to seep through into basements where it was removed promptly by the sump pumps. But all afternoon and into the evening a heavy wet snow fell.

Throughout the early part of the evening, the river continued to rise, but with little indication to the man on the street that there was coming down both rivers a wave-like rise which before midnight would pile up water at the river junction and flood the entire industrial and downtown business sections of the city.

Late evening attempts to get to plants visited throughout the day were in vain, as these factories were surrounded by water pouring voluminously into basements, putting out fires in the boilers and soaking motors and other electrical equipment so mounted as to remain in operating condition until water in the basements had reached a depth of 7 ft.

Attempts to reach other flood plants not quite so close to the river by automobile at about 1 a.m. also failed. The depth of the river by this time was reported to be greater than the record 35½ ft. With water pouring over the flood gates, elevator, switchboards shorted and pumps flooded, nothing could be done except carry available office records and light perishables up stairways to higher floors.

Before 3 a.m., plants along the river were filled to more than office-desk depth on street floors, and the water was still rising rapidly to pass the reported 37 to 38-ft.-depth level and spread over a wide front.

By noon Wednesday, the waters had reached a reported river depth of 45 ft. and were still rising. Dairy plants safe on high ground were in a quandary because their wagons had to return milk and other products to plant coolers with a limited storage capacity.

Bakeries situated in safe areas were called upon to produce for other bakeries which had been flooded out. To add to the problems of all the food manufacturers in safe areas, telephone service went out of commission after 10 a.m. Wednesday. And before 3:30 p.m., electric power and light service failed.

At a reported maximum river depth of approximately 49 ft., the flood waters had invaded areas heretofore considered safe and had rendered ineffective all safeguards which previous flood experiences had caused food manufacturers to adopt as protection for their plants.

Nearly 30 years ago prediction was made that such a flood as this was possible for the Pittsburgh area. No assurance exists that there will not be another one next year, or for that matter again this year. A post-flood survey will indicate what safeguards will be required for protection against another such catastrophe.

Concentrates

▶ COPELAND'S food and drug bill again is on the legislation "live list," but administration backers demand restoration of a stronger seizure section and refuse to surrender advertising to FTC. . . . The Robinson-Patman price-discrimination bill has been reported, with amendments, by the House judiciary subcommittee. . . . Jan. 31, 1937, has been fixed as the date for paying the unemployment insurance tax under the Social Security Act.

▶ THE FTC dairy-industry investigation is practically completed, and a final report soon will be written. . . . Fisheries on the Pacific Coast are fighting the Johnson-McGrath Bill, which would do away with sea-going reduction ships which process sardines. . . . National Association of Margarine Manufacturers has been organized to study problems of the industry; Charles H. Janssen is executive-secretary; Columbus, Ohio, is headquarters.

▶ TUNA liver oil is more potent than cod liver oil by 15 times in vitamin A and 500 times in vitamin D, preliminary tests at University of California indicate. . . . Gratifying reduction has been made in the lead arsenate spray residue on apples and pears of the 1935 crop, the Department of Agriculture announces.

Men . . . Jobs . . . and Companies

Industry

• ABBOTTS DAIRIES, INC., Philadelphia, has been sued by Vogt Processes, Inc., for alleged use of freezers infringing on Vogt patents.

• BORDEN CO., New York, has appropriated $1,500,000 for promoting the sale of ice cream this year. The company has taken over Samarkand Ice Cream Co., Los Angeles.

• COMMONWEALTH BREWING CORP., Springfield, Mass., is installing equipment for beer in 12-oz. cans.

• DAVIDSON BISCUIT CO., Mt. Vernon, Ill., and Hampton Cracker Co., Louisville, have consolidated. The merged company will be known as the Consolidated Biscuit Co. Net sales of the two concerns last year amounted to $4,736,183.

• DELUXE FOODS CORP., New Orleans, La., will double the capacity at its plant in Senatobia, Miss., and will acquire several other factories. The company reports that lower-cost raw materials from the South have contributed to its rapid expansion.

• FROEDTERT GRAIN AND MALTING CO., Milwaukee, is constructing new grain elevators with a capacity of 1,500,000 bu. at a cost of $350,000.

• GOLDEN STATE CO., LTD., San Francisco, now is delivering an ice cream mix from door to door with the morning milk.

• KRAFT-PHENIX CHEESE CORP. has opened at Cameron, Texas, a milk plant with a capacity of 20,000 lb. daily.

• MINNESOTA VALLEY CANNING CO., Le Sueur, has purchased fourteen plants formerly operated by Associated Quality Canners, Ltd., of Canada, and has formed a new operating company, Empire Foods Corp., Ltd., Toronto. The new company, headed by John Wall, president of Fine Foods of Canada, Ltd., will be one of the two largest canning organizations in the British Empire.

• NATIONAL BISCUIT CO., New York, is said to be planning a $1,500,000 expansion in Atlanta. Preliminary plans contemplate a large, modern plant, warehouse, offices, equipment and machinery.

• NATIONAL SUGAR REFINING CO., Yonkers, N. Y., will be liquidated before May 15. Equipment worth $2,500,000 will be sold. Buildings will be wrecked.

• MOORES & ROSS, Columbus (Ohio) branch of Borden Co., has taken over all routes and trucks of Dairy Farmers Distributing Co.

• OCEANSIDE (Calif.) CANNERY CO. will build a new tomato packing plant with a daily capacity of 12,000 cans.

• PABST BREWERY CORP., Milwaukee, will build in Toronto a $2,000,000 plant to serve its foreign markets.

• PILCHARD FISHERIES, INC., Portland, Ore., soon will put into operation a 10-ton fish reduction plant at Warrenton, Ore.

• RIONA PRODUCTS CO. will build at McAllen, Tex., a citrus and vegetable canning plant with an output of 500,000 cases a season.

• C. F. STOECKER has been promoted to manager of production for Tea Gardens Products Co., Seattle. W. C. Ventsam has assumed management of the Portland plant of the company.

• LOUIS F. SWIFT, JR., has been succeeded as manager of Swift & Co.'s Fort Worth plant by John H. Hall and will go to Chicago to take a position in the beef department.

DR. EDWARD C. JOSS

First connected with the Bureau of Animal Industry in 1902, he is now chief of the Meat Inspection Division. He succeeds Dr. A. J. Pistor, who died several weeks ago.

• SHIRLEY W. WYNNE, ex-health commissioner of New York, has established the Shirley W. Wynne Public Health Laboratories, Inc., which will test and certify the quality of manufacturers' products.

• WM. WRIGLEY, JR., CO., will spend $250,000 to install air conditioning equipment in its offices at Chicago.

• PENNSYLVANIA SALT CO. will erect at Tacoma, Wash., a plant for hydrogenating fish, vegetable and other oils.

Personnel

• RALPH BECKER has gone with Van Arman Cereal Co., Detroit. He was a consulting food engineer with Buffalo Foundry & Machine Co. for twelve years.

• W. E. BROCK, Chattanooga, Tenn., has been placed at the head of the recently organized steering committee of National Confectioners' Association.

• HAROLD J. BROWNLEE, technical director at the Cedar Rapids (Iowa) plant of Quaker Oats Co., is being transferred to London. He will be operating manager of a new cereal plant.

• AUGUST BUSCH, JR., Anheuser-Busch, Inc., is president of Brewing Industry, Inc., a new organization in the beverage field, with headquarters in Chicago.

• PAUL H. CHAMBERLIN now is superintendent of production for Van Arman Cereal Co., Detroit. He comes from the automobile industry.

• FRANK CHRIST has been placed in charge of confectionery manufacture for Kroger Grocery & Baking Co., Cincinnati. He recently was connected with D. Goldenberg, Inc., Philadelphia.

• A. H. DEUTE, formerly sales manager for Ruppert's Brewery, New York, recently became president of National Brewing Co., Baltimore, Md.

• D. FRANKLIN FISHER, formerly research and development chemist for Stokely Brothers Co., Indianapolis and more recently a consulting food technologist, has accepted a position with the Food and Drug Administration.

• JAMES R. KEENAN has been elected vice-president of Reid Murdoch & Co.,

Chicago. He had been manager of the Boston office and plant.

• G. G. KINDERVATER, general manager of the brewery division of Anheuser-Busch, Inc., St. Louis, has been given the additional duty of directing sales in the cabinet department, refrigeration division.

• OSCAR KRUMPFUS, assistant manager of Russell (Kan.) Milling Co., succeeds the late F. W. Hamm as manager.

• E. F. KRUSE, Brenham, heads up Texas Ice Cream Manufacturers' Association for the coming year.

• E. J. LAUCKS has taken a position with P. J. Ritter Co., Bridgeton, N. J., as a sales executive. He had been assistant sales manager with Follmer, Clogg & Co.

• JULIUS E. LINDE has resigned as president of Seaboard Packing Corp., Long Beach, Calif., following the sale of that company to San Carlos Canning Co., Monterey.

• ORVILLE E. MAY, of the Bureau of Chemistry and Soils, has been transferred from Washington to Urbana, Ill., to take charge of the new laboratory that is to carry out research on new industrial uses for soybeans.

• HARRY A. NOYES, recently managing director of Applied Sugar Laboratories, Inc., New York, has joined the staff of Arthur D. Little, Inc., Cambridge, Mass.

• W. E. PEMBERTON succeeds the late H. J. Walsmith as president and general manager of Corbett Ice Cream Co., Denver.

• PAUL RANSING has taken a position in the pickle and vinegar manufacturing division of Rhode Island Sales Co., Providence.

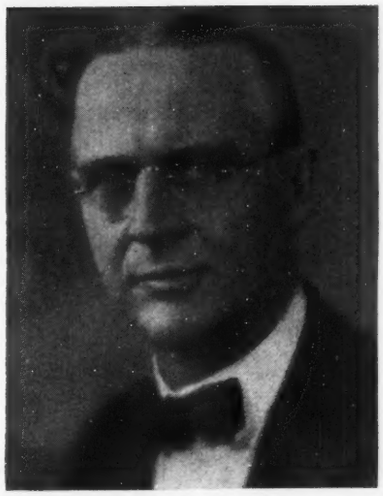
• WALTER SANDER recently became secretary of Fremont (Wis.) Cheese Co., succeeding Henry Schwartz.

• M. L. SCHMIDT, Louisville, has again been elected president of Kentucky State Bottlers' Association.

• THOMAS B. SCHMIDT, Capital Bakers, Inc., Harrisburg, Pa., is the new president of Pennsylvania Bakers' Association.

• G. F. SIEMERS has gone with Vitab Products, Inc., New York, as technical director. He formerly was technical director of McKesson & Robbins, Inc.

• ARTHUR SPADER, Blue Moon Ice Cream Co., Bergenfield, N. J., recently was elected president of the National Association of Independent Ice Cream Manufacturers.



JOHN B. SCOTT
He succeeds F. W. Ellis, retired, as vice-president in charge of transportation for Armour & Co., Chicago.

• DAVID SPRINGER is the new president of Better Foods Co., Chicago.

• H. L. STICKNEY now is manager of Clyman (Wis.) Canning Co.

Deaths

• GOTTFRIED BAUMANN, 54, president and general manager of H. & M. Baking Co., Fremont, Ohio, Feb. 24.

• HENRY W. BREYER, 57, retired president and founder of Breyer Ice Cream Co., Philadelphia, March 5.

• E. E. COXSHALL, 65, president of Brandon (Wis.) Canning Co., Feb. 26. He had been in the canning industry since 1910.

• LEWIS A. CUSHMAN, SR., founder and chairman of the board of Cushman's Sons, Inc., March 10. He had retired in 1928, after devoting 50 years to building up a large chain of bakery shops.

• WILLIAM F. GAMAGE, 57, a director of Gorton-Pew Fisheries and associated with Birdseye Frosted Foods, March 2, at Gloucester, Mass.

• NORMAN GOLDBERGER, 52, president and chairman of the board of directors of Fidelio Brewery, Inc., New York, March 3.

• FRANK G. GOULD, 75, president of Silver Lane Pickle Co., East Hartford, Conn., recently.

• LEE LEWIS, 72, founder of Louisville ice cream and candy companies bearing his name, Feb. 21.

• GEORGE G. PARKER, 85, a pioneer in the yeast industry and for many years owner of Boston Compressed Yeast Co., Feb. 25. He was retired.

• WALTER L. PHELPS, 78, president of Greenfield (Mass.) Baking Co., and Smith-Carr Baking Co., March 11.

• ARTHUR E. PIPER, 51, manager of Shurtleff Ice Cream Co., Janesville, Wis., and past secretary of Wisconsin Association of Ice Cream Manufacturers.

• ANTONIO SCALA, 79, founder of the Scala Packing Co., Utica, N. Y., Feb. 25.

• WILLIAM SCOLA, 76, one of the founders and former president of Scola Rice Mill Co., New Orleans, Feb. 19.

• BERNARD O. WELLS, 58, manager of the claims department of Swift & Co., Chicago, for the past 31 years, March 10.

• CHARLES F. WONSON, 76, founder of Gloucester Salt Fish Co. and Gold Seal Brand Packing Co., Gloucester, Mass., March 4.

• ALFRED W. WOODS, 78, president of Woods & Sprague Milling Co., Albion, N. Y., and active in the flour milling industry for 60 years, March 10.

Associated Industries

• BOSTITCH SALES Co. has completed additions to its plant and general offices at East Greenwich, R. I.

• INTERNATIONAL NICKEL CO., INC., has established field representatives at Chicago and Los Angeles. H. L. Geiger is at the former office, while A. G. Zima is in Los Angeles.

• OWENS-ILLINOIS GLASS Co., Toledo, has changed the name of its milk bottle division to "dairy container division."

• PATTERSON FOUNDRY & MACHINE Co., East Liverpool, Ohio, will spend $100,000 in plant extensions. The company also announces the employment of Harry M. Brown in its sales organization.

• READ MACHINERY CO., INC., has appointed J. H. Cunningham field representative and salesman in the South, with headquarters at Atlanta.

Manufacturing Lard

(Continued from page 180)

F. It then is removed from the drum by a scraper and falls into a compartment where it is worked by an agitator. The speed of the agitator affects the color and texture of the product, rapid agitation making it light and fluffy. Since the chilling and packaging room is at 38 deg. F., steam is passed through the hollow agitator shaft to keep the lard "fluid."

While accurate plant figures are not available on the amount of refrigeration required for the chilling operation, a lard roll of this size usually takes about 12 tons when handling 2,500 lb. of lard an hour.

FROM the agitator compartment the chilled lard passes through a rotary pump, a fine-mesh steel strainer and a pipe with three "drops" for filling cartons, cans and tubs, and drums. This pipe returns to the agitator compartment to recirculate the overflow of lard, a spring-operated valve in the line maintaining a pressure at the package filling outlets. This continuous circulation of lard through the pipes avoids congealing in the line. The pipes are equipped with compressed air lines so they can be blown out when operations cease.

Cartons are filled from a hand-operated measuring machine. To facilitate this type of packaging, the operator has on his left a wooden tray containing 60 of the one-pound cartons standing on end with the tops open and the greaseproof parchment bags inside. As the cartons are filled they are again placed in trays of this type and set on a table until they have been closed by hand. Then they are taken to a storage room where the temperature is 38 deg. F. Cans of various sizes up to 25 lb. and wooden tubs containing 55 lb. are filled from a hand-operated valve, being set on a scale directly under the valve for accurate measurement. Steel drums are filled from a third outlet, also a hand-controlled valve. Each of these outlets is equipped with a strainer to give added protection against foreign material in the product.

Two men usually work in this chilling and packaging department, and they can fill up to 1,200 of the one-pound cartons an hour. With the cans, tubs and drums, their production is many times greater. Most of the lard is sold in wooden tubs.

The steel drums used for part of the bulk lard formerly were galvanized, but this coating is being replaced with tin as fast as they need refinishing. The company finds that the tinned drums withstand the handling received in shipping better, and there is no danger of the metal flaking off and getting into the product.

By the time packaging is completed the lard has been in the process of manufacture not more than eight hours. The shortness of this time may be appreciated by comparing it with other methods. One, for instance, requires that long for cooking alone.

Merkel is completely satisfied with this method of making lard. Its first cooker was installed in 1928, the second, in 1931. Costs have been low, the yield from raw materials good and the quality commendable. Testimony to the high quality is found in the fact that 50 per cent of the lard is bought by bakers who cannot afford to use shortening high in free fatty acid content or off in flavor.

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SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

Malting Barley

(Continued from page 204)

automatically regulated metabolic activity, is not endangered. At the same time the enzyme concentration necessary to the transformation of

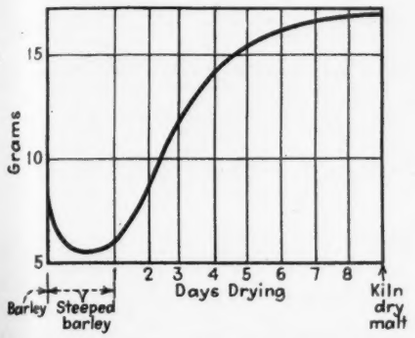


Fig. 7: Increase in Cold Water Extractables in Barley During Malting. Amount of cold water extractables present is a measure of the enzymic changes which take place in germinating grain. Totals appear low because of respiration losses.

the contents of the grain and other chemical action is actually attained; of course, the principal goal of the maltster.

Considering now the totality of all the enzyme processes in the germinating grain we find them all present in some degree in the amount of extract soluble in cold water under consideration at the time. However, it must be remembered that the results appear to be low because of the respiration loss. In Fig. 7, the change in cold water extract is graphically presented as taken from a study of Lüers and Schild. The remarkable increase accompanying the progressive germination and solution process is apparent.

In this discussion of enzymic changes taking place during malting only the bolder aspects of the subject have been covered. Regrettable limitations have frequently been imposed to keep the length of the discussion within reasonable bounds.

Accounting

(Continued from page 172)

weight during the baking process. The finished goods inventories are posted from the reconciliation of production with distribution. Next the production sold is listed according to the method of distribution. This information is taken from the appropriate form.

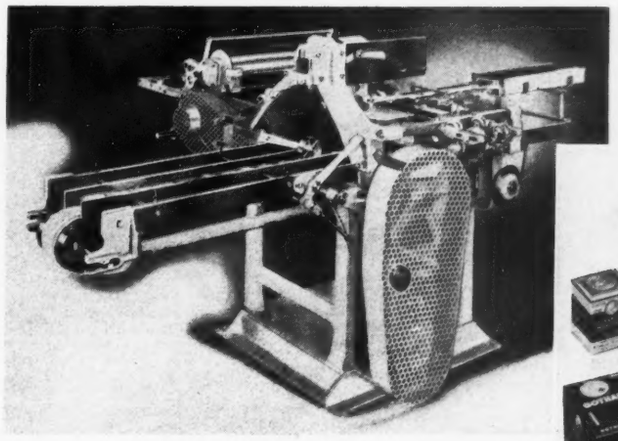
Unsold production consists not only of cripples, samples and donations listed on the reconciliation sheet, but also route stales, fresh returns and plant overbake staled. Route stale returns must be considered because it is the general practice in the baking industry to exchange fresh products for products in the store which are stale or otherwise unfit for sale as fresh goods. While credit is allowed the salesman for these returns, they must be controlled, otherwise there would be an unnecessarily large loss.

From the gross stales is deducted the amount obtained from the sale of stale bread. Net stale loss and loss from total unsold production is extended and the total being accounted for is compared with the total to account for, and the loss or gain from unaccounted-for is reflected.

Under production statistics are listed total daily figures from the Mixing Report. The controllable cost factors of absorption, production per man-hour, loss or gain in scaling, dusting flour, lubricants (which are edible oils and greases used for lubricating troughs, pans and the divider) are determined and reflected daily. The other information is shown only on the weekly and periodical managers' reports.

If the managing executive so desires he may submit on a questionnaire provided, a copy of the final four-week period or monthly figures for analysis and comparison costs.

LOW-COST
Adjustable Wrapping Machine
Handles a wide variety of sizes



For plain or printed transparent wrapping or printed paper wrappers

THIS modern machine—Model FA—has won wide favor among package goods manufacturers, because of its comparatively low cost, its high production capacity and the *wide range of sizes it can wrap.*

Accommodates packages from 1½" to 12" long; 1" to 5" wide; ⅜" to 3¼" high. A similar model (FA-2) wraps larger packages in the following range: 5" to 12" long; 3½" to 7¼" wide; 1" to 4½" high.

Wraps packages in *plain* or *printed* transparent material or foil in *roll form,* making large savings in the cost of this material in sheet form, as used for hand-wrapping.

If printed paper wrappers are used, the machine is equipped with sheet-feed mechanism. When printed transparent material or foil is used, the machine has an electric-eye registering device which locates the printing accurately on the package.

Speed—60 to 75 per minute.

The FA offers a splendid opportunity to modernize your wrapping equipment at extremely low investment cost. *Write for particulars.*

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PACKAGE MACHINERY COMPANY
Over 200 Million Packages per day are wrapped on our Machines

PATENTS

Swiss Cheese Containing Eyes Encased by Slices of Hard Cheese Without Eyes—Clyde L. Mitchel, El Monte and Elbert L. Wetmore, Alhambra, Calif. to Challenge Cream & Butter Association, Los Angeles, Calif. No. 2,025,544. Dec. 24, 1935.

Confection Mixture Frozen in Sheets and Rolled to Form Confection Having Non-Adherent Layers—Ernest E. Lindsey, San Francisco, Calif. No. 2,025,757. Dec. 31, 1935.

Confection Comprised of Sugar Dispersed in a Fat and Containing a Phosphoric Acid Ester of Organic Polyhydroxy Substance—Benjamin R. Harris, Chicago, Ill. Nos. 2,025,985 and 2,025,986. Dec. 31, 1935.

Fish Treated to Recover Oil During Preparation for Canning—John M. Devers, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,026,022. Dec. 31, 1935.

Yeast Fermentable Mash Prepared From Hydrol—David A. Legg, to Commercial Solvents Corp., Terre Haute, Ind. No. 2,026,237. Dec. 31, 1935.

Vitamin Content of Oils Increased to Predetermined Concentration—Horatio Porter Loomis, to Silmo Chemical Co., Inc., Vineland, N. J. No. 2,026,395. Dec. 31, 1935.

Pretzels Formed Mechanically—Harrison S. Gipe, York, Pa., to Quinlan Pretzel Co., Inc., Reading, Pa. No. 2,026,526. Jan. 7, 1936.

Canning Under Vacuum—John M. Young, Brooklyn, N. Y., to American Can Co., New York, N. Y. Nos. 2,026,601 and 2,026,602. Jan. 7, 1936.

Egg Composition Containing an Ingredient of High Molecular Weight Fatty Acid Ester of a Polyglycerol—Benjamin R. Harris and Marvin C. Reynolds, Chicago, Ill. No. 2,026,631. Jan. 7, 1936.

Soy Beans-Denatured of Natural Flavor Without Scorching—Lowell O. Gill, to A. E. Staley Manufacturing Co., Decatur, Ill. No. 2,026,676. Jan. 7, 1936.

Solid Food Substance Dusted With Vegetative Antioxidant to Prevent Oxidation Deterioration—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,026,697. Jan. 7, 1936.

Cereals Converted Into Puffed Form—John L. Ferguson, Joliet, Ill. No. 2,026,734. Jan. 7, 1936.

Preparation of Phosphoric Acid Esters of Fatty Acid Monoglycerides—Benjamin R. Harris, Chicago, Ill. No. 2,026,785. Jan. 7, 1936.

Nuts Salted by Treatment With Saline Solution Containing Colorless, Odorless and Tasteless Dextrine—James Eustace Bizzell, Brooklyn, N. Y., and Carey Kinchen Bizzell, Elizabeth, N. J. No. 2,026,813. Jan. 7, 1936.

Confection Containing a Fat and an Ester of Sulphuric Acid—Benjamin R. Harris, Chicago, Ill. No. 2,027,167. Jan. 7, 1936.

Ice Cream and Analagous Products Solidified by Freezing and Subdivided Into Consumer Units in a Continuous Manner—Clarence W. Vogt, Louisville, Ky., and Paul Phelps, Pleasantville, N. Y., to Vogt Processes, Inc., Louisville, Ky. No. 2,027,255. Jan. 7, 1936.

Means for Preserving Grain in Storage—Jesse H. Davis, Baltimore, Md. No. 2,027,268. Jan. 7, 1936.

Meat of "Blue Crab," "Rock Crab" or "Sand Crab" Canned Without Discoloration—Carl R. Fellers, Amherst, Mass. No. 2,027,270. Jan. 7, 1936.

Food Flavoring Composition Having Vanillin Base—Arthur Alt, to Monsanto Chemical Co., St. Louis, Mo. No. 2,027,361. Jan. 14, 1936.

Method of Clarifying Sugar Cane Juices—Francis Rivers Fortier, Jeaneretta, La., one-fifth to Frank G. Campbell, Arlington Co., Va. No. 2,027,422. Jan. 14, 1936.

Solid CO2 Used as Source of Preserving Gas for Dry Commodities Packed Under Vacuum—Carl Hilmer Hansen, to John Hansen, Oakland, Calif. No. 2,027,429. Jan. 14, 1936.

Ice Cream Mechanically Shaped and Wrapped in Brick Form—Leslie A. Mapes, Palisade, N. J., to the Borden Company, New York, N. Y. No. 2,027,545. Jan. 14, 1936.

Green Coffee Beans With Moisture Content in Excess of Natural Held at Temperatures Not More Than 170 Deg. F. for Several Hours to Improve Flavor—Harold K. Wilder to Kellogg Co., Battle Creek, Mich. No. 2,027,801. Jan. 14, 1936.

Milk Preserved by Sterilizing Treatment With Colloidal Silver—George Alexander Krause, Munich, Germany to Katadyn, Inc., Dover, Del. No. 2,028,072. Jan. 14, 1936.

Pure Germinal Materials Recovered From *Ceratonia Siliqua* Seed Kernels—Moritz Bienenstock, Budapest, Hungary. No. 2,028,132. Jan. 21, 1936.

Confections Freed From Starch Matrix by Air Separation—Edward D. Rapisarda, Agawam, Mass., to National Equipment Company, Springfield, Mass. No. 2,028,410. Jan. 21, 1936.

Sliced Fruit or Vegetables Immersed in Water Saturated With Carbon Dioxide to Prevent Discoloration—Will H. Ewell, Los Angeles, Calif. No. 2,028,970. Jan. 28, 1936.

Method for Pasteurizing Liquids in Continuous Manner—Robert K. Cooney, one-half to Frank J. Keating, Yankton, S. D. No. 2,029,017. Jan. 28, 1936.

Powdered Solid CO_2 Used for Freezing Ice Cream Rapidly in Small Quantities—Clarence I. Justheim, Salt Lake City, Utah. No. 2,029,025. Jan. 28, 1936.

Meats Dusted With Mixture of 50 Per Cent Salt and 50 Per Cent of Vegetative Antioxidant to Prevent Deterioration by Oxidation—Sidney Musher, New York, N. Y. No. 2,029,248. Jan. 28, 1936.

Soy Bean Phosphatides Separated From Soy Bean Oil by Difference in Specific Gravity—Wells W. Ginn to Chemical Novelties Corporation, Cincinnati, Ohio. No. 2,029,261. Jan. 28, 1936.

Esters of Levulinic Acid Obtained by the Decomposing Carbohydrates With Mineral Acid—Gerald J. Cox, and Mary L. Dodds, Pittsburgh, Pa., to Niacet Chemicals Corp., New York, N. Y. No. 2,029,412. Feb. 4, 1936.

Crystallization of Dextrose—Charles J. Copland, North Kansas City, Mo., to International Patent Development Company, Wilmington, Del. No. 2,029,560. Feb. 4, 1936.

Manufacture of Bakers Yeast With Low Protein Content—George W. Kirby, New York, N. Y., and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,029,572. Feb. 4, 1936.

Aeration Process for Manufacturing Bakers Yeast of High Yield and Improved Quality—Alfred Schultz to Standard Brands, Inc., New York, N. Y. No. 2,029,592. Feb. 4, 1936.

Method of Straining Sugar Cane Juice—Andrew C. I. Coulter, Naalehu, T. H. No. 2,029,655. Feb. 4, 1936.

Bread Baked in Hollow Loaf Form to be Subsequently Filled With an Edible Filling—Lemuel L. Lassiter Greensboro, N. C. No. 2,029,664. Feb. 4, 1936.

Method of Refining Fats and Oils Containing an Appreciable Amount of Carotene—Vernon Jersey to S. M. A. Corporation, Cleveland, Ohio. No. 2,029,722. Feb. 4, 1936.

Pies Mechanically Trimmed of Excess Dough—Cecil F. Liles, Independence, Mo. No. 2,030,598. Feb. 11, 1936.

Water-Miscible Vitamin D Preparation—Charles W. Hooper, Sharon, Conn., to Winthrop Chemical Co., Inc., New York, N. Y. No. 2,030,792. Feb. 11, 1936.

Whole Egg Composition Containing Lipoid-Free Whey Powder—Forest H. Clickner, to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 2,030,964. Feb. 18, 1936.

Lipoid-Free Whey Powder as Emulsifier for Oil-Water System—Forest H. Clickner, to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 2,030,965. Feb. 18, 1936.

Shortening Composition for Bakers, Stabilized by Use of Less than 1 Per Cent Non-Toxic, Odorless and Tasteless Amino-Free Condensation Product of Pyrogallol and Acetone—William G. Richardson, Donald P. Grettie and Roy C. Newton, to Swift & Co., Chicago, Ill. No. 2,031,069. Feb. 18, 1936.

Eggs Mechanically Broken and Separated—William G. Young and Morton Hansen, Los Angeles, and Joseph F. Pollen, Glendale, Calif., to William G. Young & Morton Hansen. No. 2,031,294. Feb. 18, 1936.

Mechanical Pretzel Twister—Harry A. Gerland, Baltimore, Md. No. 2,031,365. Feb. 18, 1936.

Plastic Cream Containing Over 65 Per Cent Fat Reconstituted Into Liquid Product—Herman D. Wendt, West Chester, Pa., to Milk Processes, Inc., Philadelphia, Pa. No. 2,031,443. Feb. 18, 1936.

Yeast-Freed From Dark Color by Gravity Separation and Subsequent Treatment With Acetic and Phosphoric Acids and Hydrogen Peroxide—Gustave T. Reich, Drexel Hill, Pa. No. 2,031,668. Feb. 25, 1936.

Sugar-and Potash-Salts-Containing Solutions Freed From Organic and Inorganic Non-sugar Constituents by Treatment With an Ammonium Salt and Ethyl Alcohol—Gustave T. Reich, Philadelphia, Pa. No. 2,031,670. Feb. 25, 1936.

Yeast Product for Human Consumption Prepared by Mixing Together in Dry State Yeast and Sugar and Subsequently a Small Quantity of Glycerine—William Ayer McKinney, Winnetka, Ill., and Heinz G. Lorenzen, Chicago, Ill., to Kitchen Art Foods, Inc., Chicago, Ill. No. 2,031,724. Feb. 25, 1936.

Sections Cut from Individual Loaves of Bread Mechanically Assembled to Form a Composite Loaf—William Walter Hartman, Los Angeles, Calif. No. 2,031,949. Feb. 25, 1936.

Method of Making Crystalline Dextrose—John M. Widmer, Cedar Rapids, Ia., to Penick & Ford Ltd., New York, N. Y. No. 2,032,160. Feb. 25, 1936.

Raisins Cap-Stemmed by Mechanical Means—Thomas W. W. Forrest, to Sun-Maid Raisin Growers of California, Fresno, Calif. No. 2,032,406. March 3, 1936.

Color of Bread Crust Heightened by Liberation of Ammonia Under the Influence of Heat—Alfred Schultz, New York and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,032,442. March 3, 1936.

Lactic Acid Produced in Mash by Fermentation With Subsequent Neutralization by Ammonia Liberated in Mash Through Enzymic Action—Alfred F. Schultz and George W. Kirby, New York, N. Y., and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,032,443. March 3, 1936.

Doughnut Doughs Formed and Dropped Into Frying Pan at Regular Intervals During Passage of Former Back and Forth Over Frying Pan—Charles E. Carpenter, Chicago, Ill. No. 2,032,468. March 3, 1936.

Lecithin Added as Antioxidant to Solid Meat Seasoning Mixture—Carrol L. Griffiths and Lloyd A. Hall, Chicago, Ill., to the Griffiths Laboratories, Inc., Chicago, Ill. No. 2,032,612. March 3, 1936.

Pectin in Liquid Film Form Passed in a Continuous Manner Through a Precipitating Bath and Over Drying Rolls to Give a Thin Film of Dried Precipitated Pectin—William W. Cowgill, Fairfield, Conn., to Sardik, Inc., Jersey City, N. J. No. 2,032,687. March 3, 1936.

Fruit and Nuts Fed Automatically Into a Continuously Operating Ice Cream Freezing Unit—Clarence W. Vogt, to Vogt Processes, Inc., Louisville, Ky. Nos. 2,032,961 and 2,032,962. March 3, 1936.